THE IRON TRADE REVIEW

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High Costs and Low Prices Affect Pig Output

Which Declined in June and Other Furnaces Will Probably Blow Out—High Quotation on Coke is a Factor

BY GEORGE SMART

The high cost of manufacturing pig iron and the low prices are beginning to have effect in reducing the production of pig iron, as shown by the figures for June, when the output decreased 200,000 tons as compared with May. The average daily production in June was 87,229 tons, compared with 90,865 tons in May, a loss of 3,636 tons. It is noteworthy, however, that the production of coke and anthracite pig iron for the first half of 1913 exceeded the production for any similar period in the history of the trade. The total for the first half is 16,317,354 tons, a gain of 869,671 tons compared with the same period last year. The production during the first six months was at the rate of 32,635,000 tons, but the present outlook is that the production for the second half will not be equal to that for the first half.

Iron Ore Movement

The movement of iron ore from the Lake Superior region last month amounted to 7,974,444 tons, a record for June. Of this tonnage, 6,214,648 tons were received at Lake Erie ports. At the present time, the shipments from mines are rather slow, but it is expected that the movement for July will be heavy. In spite of the holidays last week, docks had no difficulty in handling all the ore that came down.

Pig Iron

Considerable activity has characterized the pig iron market in some sections of the country during the past few days, but sales are for moderate tonnages and many buyers are showing a disposition to cover for early requirements only. In the south, following the sales at $10, Birmingham, for No. 2, which were unquestionably made, there has been some reaction, and $10.50 now seems to be the minimum. The Tennessee Coal, Iron & Railroad Co. has determined not to sell at less than $11, Birmingham, for No. 2, and unless it can get this price, will blow out furnaces. This action may have some effect in strengthening the southern pig iron market. In basic, the American Steel Foundries has bought 5,000 tons for July and August, for plants at Sharon and Alliance, at about $14.75, delivered, and the Pittsburgh Steel Co. is reported to have bought 5,000 tons of basic. The eastern basic market is represented by a quotation of about $15.50, delivered. The steel-maker in the Philadelphia district reported last week as having closed for some tonnage has purchased about 5,000 tons additional. A Bridgeport company has finally distributed about 5,000 tons of basic among eastern New York, Buffalo and eastern Pennsylvania producers. A Dover, N. J., concern has closed for 5,000 tons of No. 2X for last half on the basis of $15.50, delivered, which is equivalent to $13.75, Buffalo, a lower price than has heretofore been quoted. The American Brake Shoe & Foundry Co. has purchased about 5,000 tons of iron, principally in the south and in the Chicago district. The Ulster Iron Works, Dover, N. J., has taken 3,000 tons of charcoal iron. The Allis-Chalmers Co. has purchased about 2,500 tons of northern foundry grades. The re-selling of Ironton, O., iron at $14, furnace, has caused some disturbance in that district. Leading foreign makers of ferro-manganese have reduced prices $2.50 per ton and are now quoting $58.50, seaboard. The prospect of putting this alloy on the free list has influenced the market.

Coke

Coke is being firmly held at $2.50 for furnace grades for last half delivery. An Ohio consumer has bought 10,000 tons for prompt delivery at $2.50. Some furnaces announce that they will blow out rather than pay that price for the last half of the year. There is some contracting for foundry coke at $3.

Railroad Buying

The Southern Railway is understood to have placed 10,000 tons or more of rails for this year's delivery with the Tennessee Coal, Iron & Railroad Co., and is still inquiring for 5,000 tons, which will probably go to the Maryland Steel Co. This company is also inquiring for from 50,000 to 55,000 rail joints. Railroad buying is very limited at the present time, especially in cars.

Wire Products

The American Steel & Wire Co., which makes about 70 per cent of the product, is holding firmly to $1.80 for wire nails, but a number of independents are freely cutting this price $2 per ton. Improved crop prospects in the west have been favorable for the wire trade and it is hoped that the $1.80 quotation will prevail on fall sales.

Pig Iron Output in First Six Months is Record

But Production is Steadily Declining—June Total is 200,000 Tons Less Than in May, With Merchant Stacks Showing Greater Loss

The production of coke and anthracite pig iron in the first half of 1913, easily exceeded the output in any like period. With an output in June of 2,616,883 tons, the total for the half year is 16,317,354 tons, compared with 15,447,683 tons in the last half of 1912, a gain of 869,671 tons.

Production during the first six months was at the annual rate of 32,635,000 tons, the record holding year being 1912, with 29,325,513 tons. The second half of 1912 opened, however, with the average daily output increasing, while the present half-year period opens with the average steadily decreasing.

COMPLETE PIG IRON RECORD FOR PAST TWELVE MONTHS.

	Merchant.	Non-merchant.	Ferro.	Spiegel.	Totals.
July	574,880	1,799,971	13,581	14 135	2,402,567
August	627,842	1,845,546	14,205	12,570	2,500,163
September	650,505	1,768,992	16 972	7,985	2,444,454
October	698,408	1,956,143	18,840	10,254	2,683,645
November	715,502	1,904,384	14,428	5 248	2,639,562
December	755,894	2,000,882	10,508	10,008	2,777,292
Total second half 1912	4,023,031	11,275.918	88,534	60,200	15,447,683
January	774,208	1,994,363	7,125	12,104	2,787,800
February	748,496	1,808,430	9,837	11 907	2,578,670
March	821,333	1,917,750	17,286	6,454	2.762,823
April	762,770	1,965,575	16 752	9,256	2,754,353
May	786,131	2,008,852	11,168	10,674	2,816,825
June	716,751	1,876,320	17,403	6,409	2,616,883
Total first half 1913	4,609,689	11,571,290	79,571	56,804	16,317,354
Grand total	8,632,720	22,847,208	168,105	117,004	31,765,037

The fiscal year, just ended, broke all records for consecutive 12 months' output, with 31,765,037 tons, the first time the 30,000,000-ton mark has been exceeded.

In December, 1912, the average daily rate was 89,590 tons, while during June it was only 87,229 tons, a decrease of 2,361 tons. The number of stacks also shows a decrease, 291 being active on Dec. 31, and 283 on June 30, a difference of eight.

Merchant furnaces made the greatest gain during the first six months of 1913, their output being 4,609,689 tons, compared with 4,023,031 tons in the second half of last year, an increase of 586,658 tons. Steel works or non-merchant stacks produced 11,571,290 tons in the first half of 1913 against 11,275,918 tons in the last half of 1912, a gain of 295,372 tons.

The average daily production in June was 87,229 tons, compared with 90,865 tons in May, a loss of 3,636 tons.

The loss in production of June against May was 200,000 tons, the June output being 2,616,883 tons compared with 2,816,825 in May, a difference of 199,942 tons. A larger part of the loss was borne by the merchant furnaces.

Merchant iron production in June was practically equal to the November output, being less than in any intervening month. In June, merchant furnaces produced 716,751 tons, against 786,131 tons in May, a loss of 69,380 tons. The steel works or non-merchant furnaces produced 1,876,320 tons in June and 2,008,852 tons in May, a loss of 132,532 tons.

The net loss in active stacks, comparing the last days of May and June, was two, 10 furnaces being relighted and 12 blown out. Four merchant stacks went into blast and nine blew out, a net loss of five. Six non-merchant stacks were relighted and three blown out, a gain of three. In addition two merchant furnaces blew out July 1, while two others were scheduled for the torch during the first week of July.

Ferro production in June was 17,403 tons, compared with 11,168 tons in May, a gain of 6,235 tons. Spiegel production in June was 6,409 tons, and in May 10,674 tons, a loss of 4,265 tons.

The merchant stacks relighted in June were: Ashland No. 2, Ashland Iron & Mining Co., June 25; Hamilton, Hanging Rock Iron Co.; Stewart, Stewart Iron Co., Ltd., June 21; the new furnace of the Oriskany Ore & Iron Corporation, June 5.

Merchant stacks blown out were: Bessemer No. 2, June 21, and Bessemer No. 4, June 22, Tennessee Coal, Iron & Railroad Co.; Genessee, Corrigan, McKinney & Co., June 18; Colonial, Colonial Iron Co., June 3, relining; Colebrook No. 2, Lackawanna Iron & Steel Co., June 1; Palmerton No. 2, New Jersey Zinc Co., June 10; LaFollette No. 1, LaFollette Iron Co., June 4; Allegheny, Allegheny Ore & Iron Co., June 30; Ivanhoe, Ivanhoe Furnace Co.

Steel works furnaces relighted were: Gary No. 8, Indiana Steel Co., June 16; one Lackawanna, Lackawanna Steel Co.; Harriet "Y", Wickwire Steel Co., June 27; one Haselton, Republic Iron & Steel Co.; one Isabella, June 18, and one South Sharon, June 27, of the Carnegie Steel Co.

Steel works furnaces blown out were: One Ohio, June 28, and one

JUNE PIG IRON.

States.	No. of stacks.	No. in blast last day of month. June	May	Total tonnage made. Merchant.	Non-Merchant.	Totals— June.	May.
Pennsylvania	157	114	116	189,186	854,740	1,043,926	1,146,663
Ohio	72	61	60	186,832	434,675	621,507	664,933
Alabama	45	21	23	97,540	65,985	163.525	179,203
Virginia	22	8	9	32,928	.....	32,928	32,324
New York	27	20	19	91,328	94,642	185,970	192,710
New Jersey	7	2	2	10,996	.....	10,996	10,906
Illinois	26	22	22	44,264	226,682	270,946	290,481
Colorado	6	3	3				
Indiana	10	10	9				
Maryland	4	3	3				
Wisconsin	6	4	4	23,971	175,571	199,542	202,641
Kentucky	7	2	1				
West Virginia	4	3	3				
Tennessee	18	7	8				
Washington	1	.	.	23,158	24,025	47,183	59,279
Georgia	2	.	.				
Texas	3	.	.				
Minnesota	1	1	1				
Michigan	3	2	2				
Missouri	1	.	.	16,548	.....	16,548	15,843
Spiegel—All states...						6,409	10 674
Ferro—All states....						17,403	11,168
Totals	422	283	285	716,751	1,876,320	2,616,883	2,816,825

Carrie, June 12, of the Carnegie Steel Co.; Bethlehem "C" of the Bethlehem Steel Co., June 28.

Dora of the Virginia Iron, Coal & Coke Co., and Chattanooga, of the Chattanooga Iron & Coal Co., went out July 1. The Globe Iron Co. and the Leetonia Steel Co. planned to light their stacks early in July.

The rebuilt furnace "B" of the Maryland Steel Co. went into blast on June 8, while furnace "C", which will be completely rebuilt, was put out on June 12.

AVERAGE DAILY PRODUCTION.

	1913	1912.	1911.
January	89,929	66,220	56,989
February	92,095	72,372	63,617
March	89,123	77,791	69,863
April	91,812	79,254	68,163
May	90,865	80,753	60,367
June	87,229	81,125	59,109
July	.....	77,502	57,294
August	.....	80,650	61,995
September	.....	81,482	65,797
October	.....	86,569	67,486
November	.....	87,985	66,637
December	.....	89,590	65,558

MONTHLY PRODUCTION.

	1913.	1912.	1911.
January	2,787,800	2,052,806	1,766,658
February	2,578,670	2,098,796	1,781,285
March	2,762,823	2,411,529	2,165,764
April	2,754,353	2,377,621	2,044,904
May	2,816,825	2,503,341	1,871,388
June	2,616 883	2,433,737	1,773,282
July	.....	2,402,567	1,776,108
August	.....	2,500,163	1,921,832
September	.....	2,444,454	1,973,918
October	.....	2,683,645	2,092,061
November	.....	2,639,562	1,999,100
December	.....	2,777,292	2,032,301
Totals	16,317,354	29,325,513	23,198,601

Eastern Store Prices

New York, July 8.—Eastern warehouse prices on finished steel products have not followed the reported reductions of $2 a ton at Cincinnati, Pittsburgh, Cleveland, Chicago and other western points, and have remained unchanged. The Waverly, N. J., schedule remains 2.15c for plates and shapes and 2.05c for steel bars for New York delivery.

At Philadelphia, which usually conforms to the Waverly schedule, the present range continues unchanged at 2c to 2.15c for bars, plates and shapes. Eastern store prices relatively have been lower than those of western centers.

PROTEST FREE PIG

Eastern Makers Declare Senate's Proposal Unfair and Disastrous.

Merchant producers of pig iron in the eastern district, at the monthly meeting of the Eastern Pig Iron Association at Philadelphia, July 3, expressed a sharp protest against the senate proposal to revise the 8 per cent ad valorem duty upon pig iron in the Underwood bill and to place the commodity upon the free list. Eastern makers declared such action was not only unfair in substance but would seriously affect their business. The eastern Pennsylvania market more than any other will have to compete against any influx of foreign iron that might result from the enactment of free iron.

Reports on the structural position of the eastern market for June presented at the meeting showed little change over May. New orders in some cases were better, but on the whole were about even.

Stocks on furnace books show a tendency towards increasing, though in the aggregate they are still small relatively.

The Alleghany Ore & Iron Co., Iron Gate, Va., advises that its Iron Gate furnace was blown out June 30 for relining and general repairs. While the work was not imperative, the company advises, advantage was taken of the lull in the iron market with a view to having the stack in first-class condition for better market conditions toward the end of the year.

ORDER OF SALE

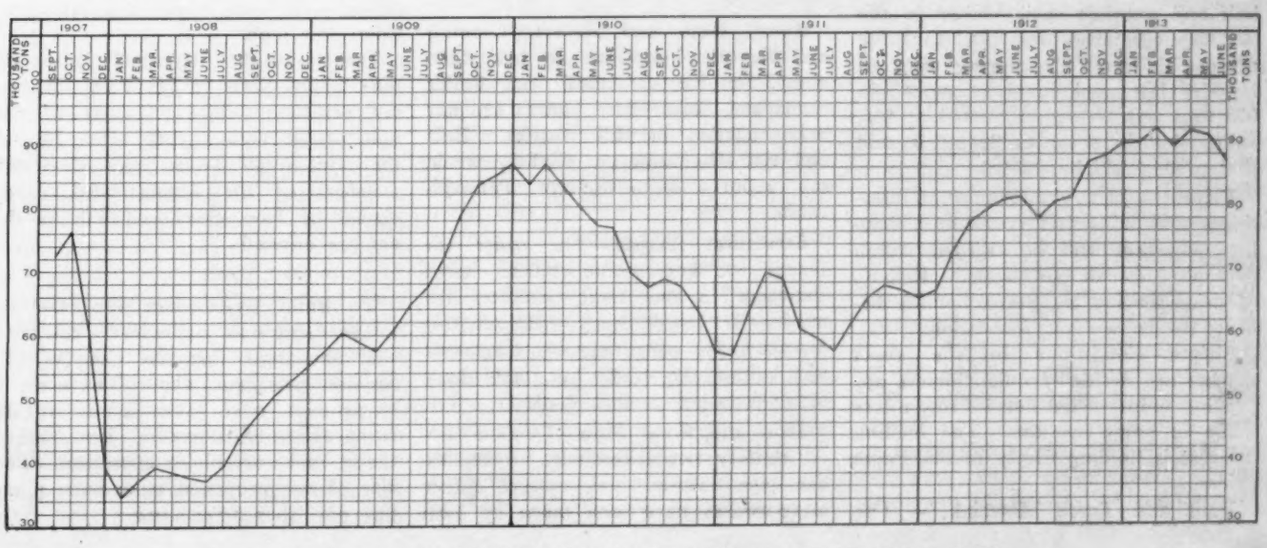
For Milliken Steel Plant is Asked by Trustees.

Francis Dykes, Forsythe Wickes and Louis H. Freedman, trustees in bankruptcy for Milliken Bros., Inc., have filed a petition in the United States district court, at New York City, asking for an order to sell the plant and real estate at Staten Island, the contracts and other assets of the firm. The trustees represent that a much better price will be realized for the creditors if the plant, contracts, etc., are sold while the business is active. The properties of the firm are now being appraised.

The plant of Milliken Bros., Inc., consists chiefly of an open-hearth steel works, structural mill and bridge shop at Staten Island. The steel works and rolling mills have not been operated for several years, but the fabricating shop is active. The steel works consists of five 50-ton basic open-hearth furnaces with an annual capacity of 180,000 tons of ingots. The rolling mills comprise one 40-inch blooming, one 32-inch reversing roughing, one three-high 28-inch reversing structural with an annual capacity of about 150,000 tons. The bridge shop has a rated output of 65,000 tons a year. The company went into the hands of a receiver in 1907. Several months ago trustees in bankruptcy were appointed for it.

Stanley W. Dexter, referee in bankruptcy, has fixed the hearing for July 18, at 2:30 p. m., at his office at 71 Broadway, when the creditors will be asked to show cause why the order should not be issued for the sale.

The furnace of the Woodstock Iron Corporation, at Anniston, Ala., will not be put in blast until pig iron market conditions are more satisfactory.



AVERAGE DAILY PRODUCTION OF COKE AND ANTHRACITE PIG IRON

Optimistic Sentiment at Pittsburgh

Pig Iron Inquiry Heavier, But Prices Are Low —Some Transactions in Basic—Coke Firmly Held

BY C. F. WILLIAMS

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Pittsburgh, July 8.

Inquiry is no better, but iron and steel officials appear more optimistic about the future than a fortnight ago. Consumption continues at a heavy rate and indications point to a renewed buying movement in the not far distant future. Many mills were idle the latter part of last week, but shipments steadily are improving. Pig iron inquiry is heavier, but prices are unimproved. The closing of the First-Second National Bank of Pittsburgh on Monday has been the subject of considerable talk in trade circles. Although no direct effects will follow, this incident, combined with the general monetary situation, may cause farther hesitancy on the part of buyers.

Pig Iron.—Pig iron dealers say several furnaces will go out unless the price of contract fuel declines and this undoubtedly will be true if pig iron quotations do not advance. Better inquiry for foundry and basic has come out, but prices have not improved. The American Steel Foundries early this week bought 5,000 tons of July and August basic for plants at Sharon and Alliance at about $14.75, delivered. The Pittsburgh Steel Co. is reported to have bought 5,000 tons of basic, but is still negotiating for two months' requirements. On Saturday, a basic consumer in this district bought 1,500 tons of basic for immediate shipment at $14.50, valley. An eastern consumer wants 6,000 tons of basic for last half and another basic melter in the east is negotiating for 5,000 tons for prompt delivery. Scattering sales of foundry last week involved about 12,000 tons. Bessemer is quoted at $16, valley, but in some circles it is said that price could be shaded.

Plates. — Heavy consumption continues and mills feel confident a buying movement will be enjoyed within the next five or six weeks. Rumors of price shading are heard, but are believed to be without foundation.

Sheets.—Conditions in the sheet market are decidedly quiet, buyers appearing uninterested despite low offers made in some sections. The leading interest is holding firmly to maximum prices.

Rails and Track Material. — The market is quiet but mills are well protected with orders. Standard spikes are obtainable from 1.70c to 1.75c, although some makers continue to ask 1.80c. Other track fastenings are firm.

Billets and Sheet Bars.—Several sheet mills continue to buy what quantities of bars they can obtain and advise that no tonnage can be had at less than $27.50, makers' mill. Billets are scarce and some makers say $27, mill, cannot be shaded. Consumers continue to urge shipments.

Hoops and Bands.—During a quiet period such as that prevailing at the present time, it is not improbable steel hoops could be obtained $2 less than the prevailing market. So far as can be learned, however, no new tonnage has been sold recently. Hoops are quoted nominally at 1.60c. Bands are named at 1.40c.

Iron and Steel Bars.—Steel bar makers are enjoying some new buying and the 1.40c quotation is decidedly firm. Iron bars are quiet but continue to be quoted at a range from 1.65c to 1.70c. There is no change in shafting quotations, but it is understood some tonnage has been sold at 62 per cent off, or $2 less than the regular market price.

Muck Bar.—Mills in which United Sons of Vulcan are employed have suspended operations until a wage settlement can be made. Puddlers are asking $7, but manufacturers declare they will not meet the proposed rate. Muck bar is nominally quoted at $31, Pittsburgh.

Bolts, Nuts and Rivets.—Leading manufacturers continue to ask 2.10c and 2.20c for structural and boiler rivets and claim those figures are not being shaded in this district. Bolt and nut discounts are slightly weak, say reports from eastern Pennsylvania.

Structural Shapes.—The order for shapes for government colliers, noted elsewhere in this issue, indicates the market is being firmly held in this district. No inquiries of magnitude are before the trade but mills have heavy tonnages on their books.

Iron and Steel Pipe.—Demand for oil country goods continues to feature the pipe market, and several rather large orders have been taken by local mills this week. Deliveries of some sizes are improved.

Boiler Tubes.—Specifying continues rather heavy and consumers are urging shipments. Manufacturers say considerable new demand is being enjoyed. Discounts remain unchanged.

Tin Plate.—Specifying is expected to be more brisk within the next fortnight. The $3.60 base price is firm and some mills have enough orders to keep plants running at practically full capacity three or four months.

Wire.—The wire market shows no improvement and it continues to lag. As previously mentioned, quotations asked by several of the larger mills are being shaded $2 a ton. Official reductions in prices may be made.

Wire Rods.—Wire rods continue to sell at a range from $29 to $30 for either open-hearth or Bessemer products.

Coke. — An Ohio consumer bought 10,000 tons of prompt blast furnace fuel Saturday at $2.50, ovens, and that figure has represented the market the last 10 days, despite contrary reports. Very little spot coke is being offered and not many negotiations for second half fuel are pending. Before the end of the month a serious deadlock between operators and consumers is expected. The Connellsville *Courier* says production was 409,999 tons for the week ending June 28.

Old Material.—Heavy melting steel is hovering around $12.50 and no sales have been made above that figure this week. Other grades are weak but quiet.

Puddlers' Demands Are Resisted

Puddling mills in which members of the United Sons of Vulcan are employed shut down July 1 and will not resume operations until a wage agreement can be effected. Puddlers are asking a $7 rate, which mill managers claim too high.

Trouble at the Steubenville plant of the Phillips Sheet & Tin Plate Co. has not yet been settled. Owners of the mill posted notices that after July 1 the plant would be an open shop and members of the Amalgamated Association of Iron, Steel and Tin Workers are affected.

To Build By-Product Works.—Announcement was made last week that the Shenango Furnace Co., W. P. Snyder, president, expects to erect a by-product coke oven plant at its furnaces at Sharpsville, Pa., where three stacks are under operation. The size of the proposed coke oven plant has not been determined.

Buying Steel Bars in Chicago Market

Some Improvement in Pig Iron—Hot Weather and Holidays Have Effect on Business

BY H. COLE ESTEP

Office of THE IRON TRADE REVIEW,
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Chicago, July 8.

Continued buying of bars by agricultural implement makers and a slight turn for the better in pig iron conditions form the chief features of interest in the western market. In other respects, there is comparatively little activity and no tendency to stimulate purchasing by reduced prices. The recent reduction of $2 a ton in warehouse prices will not affect the prices for mill shipments according to present indications. Extremely hot weather, combined with the holidays last week were influential factors in the dormant condition of affairs. Practically all of the steel contracts expiring July 1 were completely specified and there is considerable quiet renewing of contracts for the third quarter and last half.

Pig Iron. — The low point is southern iron as far as the present decline is concerned seems to have been reached, and there has been a slight reaction toward high quotations. Offers of $10, Birmingham, for No. 2 on a fracture grading, which were prevalent a week or ten days ago, have been withdrawn and the minimum figure now stands at $10.50. Some furnaces in northern Alabama are readjusting their prices on the basis of $10.75, although no business has been done at this figure. A fair sprinkling of orders for immediate shipment indicates that some foundries are in need of iron to take care of current business. The Allis-Chalmers Mfg. Co. has purchased approximately 2,500 tons of Northern foundry grades for its Milwaukee works and is in the market for southern iron to be delivered to the Bullock plant at Cincinnati. The Loetscher-Ryan Mfg. Co., Dubuque, Ia., is inquiring for a mixed lot of 550 tons of southern iron. There are other scattering inquiries in the market, including 200 tons from a northern Indiana melter. A Chicago jobbing foundry has recently purchased a round lot of southern iron to cover contracts on hand. The Federal Furnace Co. blew out its B stack at South Chicago on July 4, and the Iroquois Iron Co. expects to blow out one of its furnaces in the near future.

Merchant Bars.—Continued active contracting by the agricultural implement makers formed practically the only interesting feature in the bar market during the past week. It is estimated that at least 200,000 tons have been closed in the west up to date, although some of the leading buyers, including the International Harvester Co., have not yet covered for their requirements. Most of the business was placed for the full year commencing July 1 and there are no reports of shading under 1.40c, Pittsburgh. Bar iron remains inactive with the top of the market at 1.50c, Chicago. Practically all of the mills in this territory were closed down from July 3 to July 7 and there will also be intermittent shutdowns for repairs during the remainder of the month. Hard steel bars are soft and are now quotable at 1.50c, Chicago. The building strike in Chicago is having some effect on the demand for reinforcing material.

Plates and Structurals.—Jobbers report a good business following the reduction of $2 a ton which was made effective a week ago. The mill situation is practically unchanged and prices are steady. Local producers are gradually gaining on their deliveries, although still in a very comfortable position from a seller's standpoint. Just at present there is practically no activity in railroad circles, although a continuance of good crop weather will undoubtedly bring out a fair volume of car business.

Rails and Track Fastenings.—Some of the western roads, including the Burlington and Santa Fe, have been sounding the market for 1914 deliveries, but there is no evidence that these inquiries were anything but tentative. Rail makers do not believe there will be any active contracting for next year's requirements until later in the summer. Prices on track fastenings are somewhat unsteady and some business has been placed at 1.75c, Chicago, although nominal quotations for ordinary quantities are 1.80c. The market for track bolts is also under pressure.

Bolts, Nuts and Rivets.—The rivet market continues in an unsatisfactory state due to excessive production. Two large plants for the manufacture of bolts, nuts and rivets are now being completed in the Chicago district, although it is expected that at least one of them will not be started up until the market improves. There is considerable shading and the makers appear hungry for business.

Sheets.—Recent hot weather has rather seriously interfered with sheet production and the market has been somewhat strengthened as a result. Specifications and orders are, if anything, a little better, although galvanized sheets are still suffering from the effects of a weakening spelter market. Store prices are being well maintained.

Wire Products.—Continued excellent crop weather has resulted in perceptibly improved sentiment in the western wire market. The leading interest carried over very little tonnage from the close of the fiscal year and is renewing contracts this week on a basis of 1.98c, Chicago, for wire nails and barb wire.

Cast Iron Pipe.—On account of the holidays last week, pipe lettings were very light. Bids on 2,500 tons, which were received at Springfield, O., have been rejected and will be readvertised. An inquiry for 350 tons is pending at Lake City, Minn. The United States Cast Iron Pipe & Foundry Co. has been awarded 2,000 tons at Cincinnati subject to the approval of the local board of control. The same maker has taken 200 tons at Pontiac, Mich.

Merchant Pipe and Tubes.—Curtailment of building operations due to a strike has cut into the local demand for the more commonly used sizes of merchant pipe. Deliveries on boiler tubes are somewhat better; specifying continues satisfactory and quotations are well maintained.

Old Material.—The scrap market is dormant and prices are without change. The local iron mills are well supplied, some of them having considerable more scrap on hand than is necessary to cover their contracts for bars. Old material is accumulating apparently in the hands of both the railroads and the dealers. There has been a little business in No. 1 railroad wrought at $10.50, Chicago, per net ton. The Chicago, Milwaukee & St. Paul has issued a list approximating 2,000 tons, including 500 tons of steel rails 4 feet and over in length, 230 tons of No. 1 wrought and 280 tons of No. 2 wrought. There have been no other railroad offerings of consequence recently.

The plant of the National Cast Iron Pipe Co., at Boyles, Ala., will be ready for operation by Sept. 1, and it is expected to make delivery of finished product early in October.

New Record for June Ore Carrying

Docks Handle Cargoes With Ease—Limited Buying of Pig Iron—Deadlock on Coke

BY GEORGE SMART

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Penton Bldg.,
Cleveland, July 8.

Iron Ore.—As was expected, the iron movement for last month was a record breaker for June, the total being 7,974,444 tons, compared with 7,567,555 tons in June, 1912. The movement to July 1 was 16,125,042 tons, an increase of 2,434,371 tons compared with 1913. At present, ore is arriving rather slowly from the mines, and in spite of the inactivity of docks on the Fourth of July and last Sunday, there has been very little delay of vessels at lower lake ports. Further evidence of the ability of ore unloading equipment to handle great tonnages rapidly has been furnished during the past few days.

Pig Iron.—Buying is mostly of the hand-to-mouth order, as foundries are contracting for a month's or six weeks' supply. As many contracts expired July 1, and shipments have been made freely, many foundries have been compelled to cover at least for temporary requirements, but the buying has been limited and buyers are still very cautious.

Coke.—There is moderate contracting for foundry coke, with $3 as the usual price. Furnaces are standing out against paying $2.50 for coke for the remainder of this year and say that they cannot afford to sell pig iron at present prices with coke at $2.50. The outcome of the contest between coke men and furnace companies is awaited with interest.

Finished Materials. — Specifications are being well maintained, and in spite of the continued quiet as to new business, optimistic sentiment prevails. In plates and shapes, eastern mills will quote 1.45c, Pittsburgh, on desirable business for western shipment and are watching closely to see that no orders escape them. On small orders for prompt shipment, however, 1.50c is sometimes obtained. In nuts, bolts and rivets, there is not much activity, but manufacturers are optimistic as to the future. Bids on the art museum, 1,400 tons, will close July 12. The recent reduction in store prices of shapes, bars and plates has been well received by the trade, but has not had much effect on the volume of business. Owing to the fact that they are not now compelled to pay premiums, as they did a while ago, jobbers are probably making as much at the reduced quotations as they did a short time ago at the higher figures.

The 1.80c price on wire nails is being freely shaded by independents. Small merchant pipe is being sold in large quantities. There is also brisk demand for reinforcing bars.

Old Materials.—Further weakness was recorded in the scrap market during the past week. Business has been very dull, owing to the absence of all the larger mills from the market. Dealers are generally pessimistic, although many are building up stocks in expectation of an upturn before winter. There seem to be no indications of a reaction in the near future. Sales of heavy melting steel have been made as low as $10.90, but $11 rules.

BUFFALO FURNACES

Blowing Out—Coke Too High—Demand is Limited.

BY FRANK R. DOLBEE

Office of THE IRON TRADE REVIEW,
Buffalo, July 8.

Pig Iron. — A further sagging in the price of pig iron, coupled with the stiff coke market and the higher price of ore, has caused three stacks in this district to go out of blast, because the furnacemen claim they were being operated under these conditions, fully 75 cents below the production cost. The furnaces taken out are: Stack X, of the Wickwire Steel Co., Tonawanda; stack B, of the Buffalo Union Furnace Co., Buffalo, both blown out Sunday last, and the Genesee furnace, of Corrigan, McKinney Co., Rochester, which went out about ten days ago. One of the Niagara furnaces of the Tonawanda Iron & Steel Co. will be taken out of blast during the current month if the prevailing market conditions do not improve. This will cut down the productive capacity of the idstrict by four stacks. About 150,000 to 200,000 tons of ore to come down the lakes for the Buffalo Union Furnace Co. will be diverted to Port Colborne, Ont., for the Canadian Furnace Co.'s new 400-ton stack, which is expected to go into blast about August 1. This is the Canadian branch of the Buffalo Union Furnace.

With a week of but four business days, sales were small and the inquiry but indifferent. Minor replacement orders made up the week's trading. There were no large purchases. The range for the week from gray forge to No. 1 foundry covers but a spread of $13.75 to $14.25. These prices are but approximate, as the market is in such a ragged condition, with so light a volume of trading that a more accurate schedule cannot be given.

Finished Material. — The mills and agencies of the district report that a little better feeling is prevailing in all lines. There is a general optimistic tone to be found in all the mill offices. The closing week of June showed that specifications came in more freely than in some time past. Last week, with three days cut off, measured a much smaller volume of business. Consumers desiring material for nearby use display a little more willingness to place their orders. There has been no change in prices, no cancellations, no improvement in deliveries, and small lots are obtainable only for extended delivery. The indications point to the development of a buying movement which is expected to be under way early in the fall.

The Lackawanna Steel Co., Buffalo, will blow in its second new 200-ton Talbot tilting furnace about the first of August. The first of these two furnaces went into operation about a month ago. The company is going ahead with the construction of four additional standard-type open-hearth furnaces which will be ready for commission late in the year.

Old Material. — The amount of trading was curtailed by the few number of business days in the past week. While the amount of inquiry and placement has been small in volume, the dealers are as hopeful as they were a week ago that conditions, when they do change, will improve. Prices have not varied during the week and so far have not stiffened, but such a course is expected.

Alliance Machine Co. Orders

The Alliance Machine Co., Alliance, O., has taken a number of important orders recently, including the following:

Kokomo Steel Co., Kokomo, Ind., charging machine, ladle cranes, and strippers.

Broken Hill Properties Co., Australia, 150-ton stripping, 100-ton ladle crane, 60-ton ladle crane, floor charging machine, soaking pit crane.

Bethlehem Steel Co., 12 standard cranes.

International Nickel Co., ladle crane.

Maryland Steel Co., same equipment as for the Kokomo Steel Co.

Better Feeling Prevails at Cincinnati

In Regard to Southern Iron—Resale Tonnage in Ironton District Has Disturbing Effect—Coke is Strong

BY S. G. BACKMAN

Office of THE IRON TRADE REVIEW,
503 Mercantile Library Bldg.,
Cincinnati, July 8.

Pig Iron.—There is apparently a better feeling among the trade in general in regard to the southern situation. Although inquiries are still rather scarce, a fair number of sales have been made by salesmen during the past week at prices that indicate that the general minimum quotation is now $10.50, Birmingham, for No. 2 foundry iron for delivery during the year. Of course, it is likely that secret concessions are still being made on certain desirable tonnages by certain furnaces, but the market is not always aware of these transactions and their influences are not felt as much as for some time past. Other furnaces are holding at $11 and $11.50, Birmingham, and sales are constantly being made at $11. The above prices include both Tennessee and Alabama brands.

The fact that there may still be some more resale iron to be had at $14, Ironton, has had a rather bad effect upon the southern Ohio situation. The furnaces are generally quoting $14.50, Ironton, but concessions are still in evidence on strictly No. 2 foundry iron. Very little spot iron is being sold, most of the contracts calling for delivery during the third and fourth quarters. Lake furnaces are reported as having recently taken several orders in Indiana at $14, furnace.

The Chattanooga furnace at Chattanooga, Tenn., has blown out after being banked for a short time, and it is rumored that several Birmingham stacks will discontinue this week. Two central Indiana concerns have taken 1,000 and 500 tons respectively of southern No. 2 foundry iron at $10.50, Birmingham, and the same price has been made on lots of 600 and 300 tons from central Ohio. There is an inquiry in the market for 1,200 tons of southern iron from a southern Kentucky melter in this territory, and another for 500 tons of southern or northern iron from Galion, O.

Coke.—The coke market is strong and prices are rather firm. There is practically no coke to be had from either the Pocahontas or New River fields, and the production was reduced somewhat last week in the Connellsville and Wise county districts, due to the July 4 holidays. Labor conditions are bad everywhere. The furnaces are still refusing to contract at the present prices, and are buying for only 30 to 60 days. Foundry sales are fair. Connellsville foundry coke for contract shipment is now quoted at from $3 to $3.25, ovens. Other prices are unchanged from those of last week.

Finished Material.—The local sheet mill has resumed operations after a shut-down of a week for repairs, as is its custom about this time of the year. This makes the mill about seven weeks behind on deliveries and specifications have been satisfactory within the past month with indications of a good fall business. Prices are unchanged at 3.40c for galvanized sheets No. 28 and 2.35c for black sheets No. 28, both Pittsburgh basis.

No changes have occurred in the warehouse market since the decline of 10 cents per 100 pounds on steel bars, iron bars, plates and shapes last week. Business is not any too good. Sales of building materials have dropped off considerably within the past month, probably due to a large extent to threatened labor troubles in this territory.

Old Material.—There is practically no change in the scrap iron market. Transactions still continue scarce and the supply of scrap in dealers' yards and throughout the country is far in excess of the demand. Foundries are not very busy in this vicinity, as is also the case with machine shops. The Newport Rolling Mills, one of the largest users of scrap in the Cincinnati market, has resumed operations again after a week's shut-down for repairs. Scattering sales through the past week have been nearly equally divided as far as can be ascertained between mixed cast, No. 1 busheling, bundled sheet scrap and No. 1 yard wrought. Prices have not changed since the decline of last week, but they are rather weak.

Good Pig Iron Inquiry at Philadelphia

But Evidence of Real Improvement is Not Strong —Coke Firmly Held—Dull Period for Scrap

BY C. J. STARK

Office of THE IRON TRADE REVIEW,
611 Bulletin Bldg.,
Philadelphia, July 8.

Holiday interruptions left their effect upon the eastern iron and steel market of the past week. Iron and steel plants were generally suspended several days and some of the iron mills are still idle for repairs. Business is slow to recover from the vacation spirit. Pig iron tonnage continues heavier, but prices rule weak.

Pig Iron.—The total inquiry for easily 25,000 to 30,000 tons of foundry, forge and basic iron is pending in this district. Though the offered tonnage is more active, there is little evidence of genuine improvement. Prices continue soft and makers are much dissatisfied with conditions. A steel maker in this district reported last week as closing for some tonnage has made additional purchases of basic for third quarter, or a total of about 5,000 tons. The price, though not positively announced, was about $15.50, delivered. The eastern basic market is not above this price. Eastern Pennsylvania makers also took some tonnage for New England shipment. A Harrisburg melter continues to negotiate for 5,000 tons or so of third quarter basic. A Virginia pipe maker bought 6,000 to 8,000 tons of southern and Virginia No. 3 and forge for forward shipment. Another Virginia pipe maker asks 1,000 tons of similar grades. Virginia iron remains $13.50, furnace, for No. 2X. The Standard Cast Iron Pipe & Foundry Co. is still figuring on 5,000 tons of low grade iron and at last reports the Baldwin Locomotive Works inquiry of 2,000 to 4,000 tons of No. 2X was unclosed. This latter competition had narrowed to two southern and two northern makers. The National Radiator Co. asks 3,000 tons of No. 2X for Trenton and 2,000 tons for Johnstown. A nearby radiator maker wants 1,000 tons and a stove shop is figuring on several thousand tons. Northern No. 2X rules about $15.75 to $16 and forge at $15, delivered eastern Pennsylvania. Standard low phosphorus remains $23.50, Philadelphia, and the Cornwall grade at $18.50 to $19, furnace. Sales are small, but one round lot is up.

Coke.—Though several eastern fur-

naces bought prompt Connellsville furnace coke at $2.10 to $2.25, ovens, 10 days ago, they now face a firm quotation of $2.50, ovens, by sellers. Some prompt sales at this price are noted. Eastern buyers usually refuse to contract ahead on this basis.

Iron and Steel Bars.—There has been some last half buying of steel bar consumers in this district at 1.40c, Pittsburgh. An implement maker divided 2,000 tons between two mills in the Pittsburgh district. The C. & O. railroad will close this week on 3,000 tons. Deliveries are steadily shortening. Some unspecified first half tonnage was cancelled July 1 by the mills. This amount was not large. Almost 1,000 tons of bars for the Baltimore filtration plant are still up. Bar iron is quiet and weak with prices ruling from 1.40c to 1.45c, mill. A number of the plants are idle for repairs.

Plates.—Eastern plate makers continue to close some third quarter and last half contracts with eastern consumers at 1.50c, Pittsburgh base. Specifications have not been so heavy because of the holiday. Eastern makers say reports that they are offering plates for western shipment at 1.45c to 1.50c, Pittsburgh, are confusing. They will not accept tank steel on this basis, but in cases will quote this price as base on locomotive firebox, boiler steel, etc., which carries large extras. The Worth Bros. Co. has finally been awarded the 5,500 tons for two government colliers.

Structural Material.—Little new tonnage is coming out and the market is quiet. Some eastern mills report slightly better bookings than last month. Offerings by the railroads are very modest. The eastern market remains well established at 1.45c, Pittsburgh. Makers find more trouble to get 1.50c, Pittsburgh, for prompt lots. Shipments of small shapes are still extended.

Sheets.—The incoming tonnage of sheets to eastern makers just about balances shipments. There is little buying ahead. Prices continue 1.90c, Philadelphia, for No. 10 gage.

Semi-Finished Steel.—Leading eastern makers were unable to accommodate all billet specifications for first half and carried over some tonnage. New business is lighter and is below shipments. A sale of 1,000 tons is noted. Open-hearth rolling billets remain $28 to $29, delivered in this district, though lower is sometimes done for western destinations.

Old Material.—Many plants have been down over the Fourth and some are still idle for regular summer repairs, so that the scrap market is now in what is normally the dullest period of the year. Coatesville and Ivy Rock mills here made additional recent purchases of heavy steel at $11.25 to $11.50, delivered, aggregating 5,000 to 7,000 tons. The lowest price was done on the smallest lots. Sellers are cautious to accept round tonnages even at offers of $12, delivered. Small sales of No. 1 railroad wrought have been made at $14.50, delivered.

Low Prices on Pig Iron in New York

Buffalo Quotations Touch New Low Point—Malleable Syndicate Awaits More Attractive Prices

BY C. J. STARK

Office of THE IRON TRADE REVIEW,
1115 West Street Bldg.,
New York, July 8.

Iron Ore.—Trading in ore in the eastern market remains quiet. Occasional sales of local ores are being made. The foreign market is without interest. About 40,000 tons of Wabana, Newfoundland, ore are scheduled to arrive in July.

Pig Iron. — Some round lots of metal for last half delivery continue to be taken in this territory, though for the moment holiday effects have left the market inactive. Emphasis is still to be laid upon the price situation which developed some further concessions this week. For that reason, producers find little encouragement in the larger tonnage. The Richardson & Boynton Co., Dover, N. J., distributed 5,000 tons of No. 2X between two Buffalo furnaces and a maker in the Lebanon district at $15.50, delivered. This price is equivalent to $13.75, Buffalo, or 25 cents lower than heretofore quoted. The American Brake Shoe & Foundry Co. bought about 5,000 tons of mixed foundry grades for last half for southern and middle western plants. The business went largely to nearby southern and northern makers, though 1,000 tons of high silicon iron was taken by a Virginia maker at $15, furnace. Another buyer in this district took 3,000 tons of special analysis iron. In New England territory, small sales have been liberal, about 5,000 tons having recently been closed, chiefly with Buffalo makers. A Phillipsdale, R. I., melter asks 3,000 to 4,000 tons of special basic, which usually goes to Virginia. The New Jersey Zinc Co. wants 875 tons of different foundry grades for last half. The Malleable Syndicate, figuring on a round tonnage, has decided to await more attractive prices. It purchased some small lots of prompt iron. A Sheffield, England, steel maker has inquired for 500 tons of low grade iron.

Ferro-Alloys. — Leading foreign makers of ferro-manganese today reduced prices $2.50 a ton, from $61, seaboard, and now are generally quoting $58.50, seaboard. The $61 price had ruled since April 1, and had been freely shaded on resale material. The market lately has been very light, which has generally been ascribed to uncertainty over the duty. About 1,000 tons are now pending. Other alloys are quiet.

Plates. — June was the lightest month of the year in car buying. Only about 2,500 cars were placed in that period. At present, the market is almost bare of inquiry, though builders have their shops well filled to fall. New plate tonnage generally is less active. Eastern Pennsylvania makers continue more aggressive for business at reduced prices and they are freely quoting 1.50c, Pittsburgh, or 1.66c, New York. Deliveries with them continue very short.

Structural Material.—Greater quietness has developed in the structural market. The holiday week has shown almost a dearth of lettings in the metropolitan district and the pending tonnage is modest. The eastern mills manifest greater need of new tonnage, but they are well maintaining the 1.45c, Pittsburgh, price. Some of the shops are still suffering from the lack of plain material. The Pencoyd plant of the American Bridge Co. broke its record of daily output in June, but the production of the other plants of this interest in the eastern district fell off because of scarcity of material.

Iron and Steel Bars. — Deliveries upon steel bars continue to improve and most sizes except the smallest rounds, flats and squares, are being furnished by the larger mills in 8 to 10 weeks. Some scattered new buying and last half contracting is going on, but this is not of great extent. Specifications are lighter. A

number of the iron mills are now shut down for repairs. This market continues rather weak.

Cast Iron Pipe.—The Degnon Contracting Co. is the low bidder on about 10,000 tons of 8 to 24-inch pipe for the extension of the metropolitan high pressure system. Its bid for the pipe averages about $28, delivered. The Standard Cast Iron Pipe & Foundry Co. received, for New York City work, 2,550 tons of 6 to 16-inch, at $22.55, delivered, and piled in Brooklyn, and 1,250 tons of 6 to 12-inch at $23.13, delivered, and piled at Long Island points. John Fox & Co. received 1,000 tons of 6 to 24-inch at $23.90, delivered, and piled in Manhattan and the Bronx. Washington, D. C., takes bids July 16 on 2,370 tons. The market is only moderately active. Sharp quoting continues on attractive lots.

Old Material.—As the market continues to drag on a low price level, trading has become increasingly difficult. Large producers are holding to their scrap against the market and dealers are not inclined to make large short sales under present conditions. The past week has been extremely quiet.

SOUTHERN MARKET

Has Developed Very Little Demand—Prices Are Stationary.

BY W. B. NEAL

Office of THE IRON TRADE REVIEW,
Birmingham, Ala., July 8.

Pig Iron.—With practically all offices closed for two days in the week on account of Fourth of July celebrations, the volume of business transacted since last report is small comparatively, and of such a nature as hardly to indicate any change in the general situation. At the foundry plants, principal interest was given to the taking of inventories, while the furnace concerns compiled figures for the first half showing, and subjected the plants to the usual cleaning up. The June movement was considerably smaller in the aggregate than that of May, but stock returns as of July 1 are not yet in hand. For shipment in July, a two-furnace plant has entered 20,000 tons of foundry grades, against a probable make of 16,000 tons, and at another operation July specifications are about equal to the probable make in that time. However, other operations than those mentioned are without specifications to take care of the July production, and as has been mentioned previously, additional stacks are to be blown out. The sales just reported indicate the maintenance of an $11 per ton, Birmingham basis, for southern shipment, with a differential of 50c per ton on that price for No. 3 foundry. A leading interest reports an aggregate of 2,500 tons sold at $11 per ton for No. 2 foundry, and an aggregate of 3,000 tons is reported by another concern at the same price. A single lot of 500 tons of No. 3 foundry was sold at $10.50 per ton at Birmingham, and 500 tons of special analysis iron for shipment over the remainder of the year sold at $12 per ton.

Small Orders for Cast Pipe

Birmingham, July 8.—Recent developments in this market are not of such a nature as to change the status of prices, nor the policy of the several producers in the matter of accumulating stocks. The placing of a fairly attractive volume of small orders for repair work, and for extensions, is mentioned, but no large tonnages have been awarded southern interests for some weeks, and the immediate prospects are not encouraging. It is understood that the large tonnages for export recently mentioned have been practically awarded northern and eastern producers.

New President of Thomas Iron Co.

Ralph H. Sweetser, superintendent of the Columbus Iron & Steel Co., Columbus, O., has been elected president and general manager of the Thomas Iron Co., Hokendauqua, Pa., succeeding B. F. Fackenthal Jr., who resigned several months ago. He was elected at a meeting of the directors at Easton, Pa., July 3. Mr. Sweetser becomes the head of one of the leading merchant iron makers of the eastern Pennsylvania district. The Thomas Iron Co. owns nine blast furnaces, four at Hokendauqua, two at Alburtis, Pa., two at Hellertown, Pa., and one at Easton, Pa., although not all of these are now active plants. It also owns the Richards iron ore mine at Wharton, N. J., numerous limestone quarries, and owns or is interested in several railroads, including the Ironton Railroad Co., the Swanson Valley Railroad Co., the Catasauqua & Fogelsville Railroad Co. and the Mount Hope Mineral Railroad Co. The company is capitalized at $2,500,000.

No award has yet been made by the Mallory Steamship Co. for the one to three steamships upon which bids were recently taken. The Newport News Ship Building & Dry Dock Co., as reported, is the low bidder upon these vessels.

IMPROVEMENT

In St. Louis Pig Iron Market—Coke Prices Strong.

BY E. C. ERWIN

Office of THE IRON TRADE REVIEW,
St. Louis, July 8.

Pig Iron.—There was a very decided improvement in the iron market in the St. Louis territory last week, and a good inquiry is still out. One sales agent reports the closing of orders last week for 7,500 tons of southern iron, all for last half delivery, mostly at $10.50, Birmingham basis, although some of it went through at $11. This same agent says he has several 500-ton inquiries that will result in sales this week. There is an inquiry out from another source for 600 tons of high phosphorus iron, one for 500 tons of northern car wheel iron, and one for 1,000 tons of southern No. 2 for last and first quarter delivery. A sale was made in Belleville today of 600 tons of southern foundry iron. Southern No. 2 is quoted at $10.50 to $11, Birmingham basis, but the price seems to be inclined to stiffen. Northern iron is unchanged at Chicago and Ironton.

Coke.—The market for Connellsville and Virginia coke, foundry grades, is strong at $3, f. o. b., ovens, and by-product coke is firm at $5.80, f. o. b. St. Louis. Two contracts of 500 tons each of foundry coke were closed today.

Old Material.—The market for scrap continues dull, and prices are inclined downward. The demand is very light. The Frisco closed a list today for 500 tons, and others will be closed this week by the Wabash for 700 tons, Missouri Pacific 700 tons and the Kansas City Southern for 300 tons. The Missouri Pacific closed one the latter part of last week for 3,000 tons.

Some Shippers Disappointed

Despite the heavy shipments of ore last week the ore shippers on the upper Michigan peninsula are apprehensive that the season may prove a dull one. They say that shipments are materially smaller than expected, especially during the last 30 days. In June, 1912, shipments from Marquette were 28,682 tons in excess of those in the month which has just closed.

Officials of the Duluth, South Shore & Atlantic Railway Co. have announced that plans for the future of ore dock No. 4 which is now being dismantled at Marquette are uncertain. No plans have yet been made to replace the structure. The old dock is only 47 feet above the lake level and is at the present time the lowest dock on the lakes. It is obsolete and uneconomical.

MODERATE BUYING

By the Railroads—Some Inquiries for Rails for Next Year.

Buying of iron and steel products by the railroads at the present time is comparatively moderate. Bridge work is coming out slowly and is usually in small jobs. As is to be expected at this time of the year, little new rail tonnage is being booked. There are a few inquiries pending for this year's delivery and two or three of round tonnage for shipment early in 1914. These usually come from southern roads which are able to do track laying in the winter. Considerable buying of track fastenings and shop material continues. The Virginian railroad has ordered 2,500 kegs of spikes from the Jones & Laughlin Steel Co., and the Chesapeake & Ohio railroad an additional lot of 1,500 kegs of spikes from the Republic Iron & Steel Co. In bolts, the Virginian and Seaboard Air Line have placed about 1,000,000 each, some of which went to eastern Pennsylvania makers, and the Norfolk & Southern is about to close for an equal quantity.

A few small orders for locomotives and cars have been placed in the Chicago district recently, including a contract for eight six-wheel switching locomotives, placed by the Indiana Harbor Belt railroad with the Baldwin Locomotive Works. Orders for track fastenings and rails are slow.

Sir Thomas Shaughnessy, president of the Canadian Pacific railway, states officially that $100,000,000 will be spent on improvements to the system this year. The appropriations include the cost of additional railway mileage, cars and locomotives, terminal facilities at St. John, Montreal, Toronto, Fort William, Winnipeg, Calgary, Vancouver and elsewhere, ocean steamships, hotels, extensions of the telegraph system, shops and sidings.

LOCOMOTIVES AND CARS.

The receivers of the Chicago & Eastern Illinois have been authorized by the court to buy four locomotives.

The Indiana Harbor Belt has ordered eight 6-wheel switching locomotives from the Baldwin Locomotive Works.

The Chesapeake & Ohio has ordered 1,000 gondola cars from the Ralston Steel Car Co.

The San Antonio & Aransas Pass Ry Co. expects to buy about 10 locomotives.

The Chicago Railways Co. has ordered 100 steel underframes requiring 224 tons of steel from the American Bridge Co.

The Chicago, Burlington & Quincy Railroad has ordered one 12-inch rotary snow plow from the American Locomotive Co.

The New York Central lines are inquiring for 27 all-steel passenger coaches.

New York Central lines have placed 23 additional locomotives with American Locomotive Co.

The Bethlehem Steel Co. has placed 65 hoppers and 25 box cars with the Pressed Steel Car Co.

RAIL ORDERS.

Los Angeles Railway Co., 500 tons girder rails to Pennsylvania Steel Co.

Tampa & Gulf Coast Railway, 5,000 tons. Inquiry issued.

BRIDGE WORK.

Pittsburgh, Harmony & Butler railway, about 2,500 tons. Bids asked.

Baltimore & Ohio railroad, about 3,000 tons for bridge on Monongahela division. Revised bids now entered.

CAR BUYING

The First Half of 1913 Exceeded Record of First Half of 1912.

During the first six months of the year 1913, a total of 85,000 cars was purchased by the railroads of the United States according to authoritative records compiled by leading builders. This total considerably exceeds the record of car purchases for the first half of 1912, which reached about 50,000. The heaviest buying of cars, however, in 1912, did not come until the last half. In the final six months period of last year from 150,000 to 175,000 cars were ordered, which brought the total of the year up to approximately 235,000 cars, or the highest mark in history.

The present year started off auspiciously in car purchases and more than 50,000 cars were ordered during January and February. In March, the movement subsided and sales were very few. There was some revival in April, when more than 15,000 cars were placed, and this continued on a reduced scale in May. The month of June just closed was the lightest of the year in equipment purchases. Only about 2,500 cars were placed in that period.

The accurate compilation by months of the cars ordered during the first half of the present year is shown in the appended table. The items upon which these totals are based have been carefully checked up and verification obtained from the purchasing railroad, so that the figures may be accepted as an approximately true record of the year to date. The figures by month, are as follows:

January	30,000
February	22,000
March	5,000
April	14,500
May	11,000
June	2,500
Total	85,000

While the car builders are entering little new business at this time, their books are still well filled with orders accumulated during the past six months or more. As a result, most of the leading works are in a comfortable position to maintain their present operations to September.

METAL MARKETS

New York

July 8.

Copper.—Domestic copper prices have not changed during the past week and business has been decidedly dull. Resale lots and some metal held in first hands, sold at 14.-62½c cash, New York, and there are still offerings in the market at that figure. The prominent selling agencies, however, continue to maintain their quotations on electrolytic at 15c delivered 30 days. Lake copper is quoted at 14.75c by some sellers, but the large producer of that brand is holding for a considerably higher price. Due to delay in receiving figures on production and shipments caused by the closing of business over the holiday, publication of the monthly statistics for June was deferred to July 9. It is well understood that a large decrease in surplus stocks will be shown.

Exports of copper from July 1 to 7, inclusive, amount to 1,565 tons.

Tin.—The London tin market has been under continuous pressure since July 1, and the early cable of this morning (July 8) shows a decline in prices of £10. Spot sold at £179 and futures at £179 15s. Local sales have been made at parity with the London quotations. Spot is offered today at 39.-62½c. Domestic consumers, however, are not inclined to buy beyond immediate needs until the foreign situation becomes settled. Future positions are held slightly higher than nearby deliveries. Arrivals of tin during the week July 1-7 aggregate 945 tons, and there are 1,642 tons afloat.

Lead.—Demand for lead has continued light and the price is unchanged from last week. Prompt shipments to this territory are offered at 4.35c.

Spelter.—Improvement in both demand for and the price of spelter is noticeable. Producers are now asking 5.35c in New York for spot and July metal, and 5.40c for August and September.

Antimony.—The antimony market continues featureless. Cookson's is unchanged at 8.75c; Hallett's at 8.25c, and other brands at 7.50c to 7.75c.

Chicago

July 8.

New Metals.—On account of the triple holiday in the eastern and St. Louis metal exchanges, the market has been very inactive recently. Copper nevertheless is a little stiffer.

We quote dealers' selling prices, f. o. b. Chicago, as follows:

Lake copper, carload lots, 15⅛c; casting, 14¾c; smaller lots, ¼c to ¾c higher. Spelter, car lots, 5.15c; lead, desilverized, 4.30c, sheet zinc, $7, f. o. b. La Salle, in carlots of 600 pound casks; pig tin, 41c; Cookson's antimony, 8¾c, other grades, 7¾c.

Old Metals.—Transactions were almost at a standstill during the past week. Prices on copper are a little better owing to the improvement in the primary market. The demand for scrap aluminum continues steady.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

Copper wire, crucible shapes, 16⅞c; copper bottoms, 12⅛c; heavy red brass, 12⅛c; heavy yellow brass, 11¾c; No. 1 red brass borings, 11c; No. 1 yellow brass borings, 8c; brass clippings, 10c; lead pipe, 3 9-10c; zinc scrap, 4c; tea lead, 3⅝c; No. 1 aluminum, 19c; No. 1 pewter, 32c; block tin pipe, 42c; tin foil, 38c; linotype dross, 3¼c; electrotype dross, 3¼c; stereotype plates, 4⅜c; stereotype dross, 4¼c.

FINANCIAL STRINGENCY

Blamed For Failure of the Noelke-Richards Iron Works.

Indianapolis, July 8.—In a petition filed in the circuit court, yesterday afternoon, by the Jones & Laughlin Steel Co., of Pittsburgh, Judge Remster appointed James P. Goodrich, of Winchester, receiver for the Noelke-Richards Iron Works, of this city. The plaintiff says the suit is friendly in nature and for the purpose of enabling the Noelke-Richards company to get out of its present difficulties.

The complaint says the defendant owes the plaintiff $42,300.88 for material, another debt of $139,223.33, which is secured by rights of liens on various structures under construction by the defendant, which sum is not included in the complaint, and about $2,000 more not yet due.

Assets of the company are estimated at $1,200,000 and liabilities at about $800,000, of which $250,000 is a mortgage debt and $550,000 in bills for material and supplies. The Noelke-Richards Iron Works operates two plants in this city and a plant at Greensburg, Pa.

The receiver has been authorized to carry out the contracts the company has, borrow whatever money is necessary and to do all things necessary to carry on the business. It is thought that in a few months the company's affairs can be placed on a more satisfactory basis.

The Noelke-Richards Iron Works, through its attorney, has made the following statement:

"The cause of the receivership of the Noelke-Richards Iron Works is not insolvency. Neither is the cause a failure to do business at a profit. The company has been making money in recent years, as heretofore. The cause of the embarrassment is merely that the large volume of business filling our three shops could not be conducted on the cash capital within the reach of the company at the moment.

"A large part of the bank accommodations of the company (being in the shape of commercial paper held in banks throughout the country) has been withdrawn owing to the financial stringency and could not be instantly replaced. This withdrawal of cash naturally embarrassed our operations. Our accounts are for structural steel and ornamental iron work and are all good.

"Our contracts can all be completed in four months. When they are completed, I confidently believe all our debts, except our small permanent bonded debts on the plants, will be paid off and leave about $200,000 of quick assets free of debt in addition to the plants in Indianapolis and Greensburg, Pa."

The Noelke-Richards Iron Works was incorporated in 1902 with an authorized capitalization of $250,000, of which $100,000 is preferred. Hugh R. Richards is president and general manager of the company.

Some time ago, the company bought from the receiver the properties of the Brown-Ketcham Iron Works in this city and Greensburg, Pa. It employs 300 men in its West Michigan street plant; 125 men in its Palmer street plants and 225 men at the Greensburg, Pa., plant.

Mr. Goodrich was suggested as receiver of the company at a meeting of creditors and officers of the concern. He has qualified as receiver and has taken charge of the business.

MOLDERS QUIT

And Demand Higher Wages in Cincinnati, Newport and Covington.

A strike for molders employed in different foundries in Cincinnati was seriously threatened on the morning of July 8, when several hundred iron molders refused to report for work. There was no disorder of any kind, as the men simply did not go to the different foundries at the usual time. The stove manufacturers were not affected and are still working as before. The molders are demanding $3.50 a day, but the employers have refused to pay above $3.40 a day. The present scale is $3.25 per day. Whether or not other molders in the city and the core makers and pattern makers will join in the strike is a question that will develop probably within a day or so. If a general strike is declared, about 2,500 men will be affected. Cincinnati foundries affected by the strike so far are the Bollman & Wilson Co., the Mowrey Car Wheel Co., the J. A. Oberhelman Co., the John Bruce Foundry Co., the Lane & Bodley Co., the Buckeye Foundry Co. and the Wessling Bros. Foundry Co. The Newport Foundry Co., Newport, Ky., and the Star Foundry Co. and the Dean Mfg. Co. in Covington, Ky., have also been affected by the recent walkout.

Will Blow Out.—The Warner Iron Co., of Nashville, Tenn., expects to blow out the Cumberland furnaces in the near future on account of quietness in the pig iron market. This stack makes soft foundry pig iron from local ores, using Virginia coke and has a capacity of 30,000 tons.

ON THE PACIFIC

Girod Electric Steel Furnaces Will Be Installed.

Arrangements for the installation of electric steel making furnaces of the Girod type, have been made by the Washington Iron Works, Seattle, Wash., and by the Portland Bronze & Crucible Steel Foundry, Portland, Ore. At the Washington Iron Works, a 3-ton furnace is being installed to be used exclusively in the manufacture of high grade steel castings. The furnace of the Portland Bronze & Crucible Steel Foundry is to be of the 1-ton type and will be devoted to crucible castings. Another American steel maker, whose plans are not yet ready for announcement, has executed a contract for the Girod license.

The new electric steel plant to be installed by the Bethlehem Steel Co., South Bethlehem, Pa., will be the largest as planned of any electric steel making process to be recently adopted in this country. This plant, as announced, will be of the Girod type, and it is understood it will probably consist of two 10-ton and one smaller furnace. These are to be employed in the manufacture of special alloy steel. The license of this company enables it to install an indefinite capacity.

Other than those mentioned, the following steel companies are using or installing the Girod electric furnace:

Rubery Owen & Co., Darlaston, England.
Gib. Ansaldo & Co., Genoa, Italy.
Putiloff Works, St. Petersburg, Russia.
Bethlehem Steel Co., South Bethlehem, Pa.
Krupp & Co., Essen, Germany.
Oehler & Co., Aarau, Switzerland.
Societe John Cockerill, Seraing, Belgium.
Stotz & Co., Kornwestheim, near Stuttgart, Germany.
Stahlwerk Becker, Krefeld, Germany.
Gutehoffnungshuette, Oberhausen, Germany.
Danner & Co., Judenburg, Austria.
Ungarisches Staats-Stahlwerk, Diosgyor, Hungary.
Simonds Manufacturing Co., Lockport, N. Y.

New Woodward Furnace. — The Woodward Iron Co. has practically completed its new blast furnace at Woodward, Alabama, near Birmingham. The new furnace, which is one of the largest and most modern in the south, will be blown in in about two months, or as soon as coke from the new ovens, which are now being warmed up, is available. It has a capacity of 450 to 500 tons daily. The new ovens, 60 in number, which were built by the H. Koppers Co., Chicago, have been added to the existing plants of 60 ovens constructed late in 1910.

STRUCTURAL BUSINESS

Does Not Show Much Activity—Some New Projects.

Structural steel lettings in the Metropolitan district have flattened off considerably and the whole eastern district is slow. Difficulty in financing propositions and expectation of lower steel prices are generally accepted as the reasons for the dullness. Another section of subway work is up for bids in New York City. Difficulty in getting plain material is still a factor of importance with the larger shops. The June output of the eastern division of the American Bridge Co. fell off considerably for this reason, though the Pencoyd plant at Philadelphia broke all records of production that month.

On account of the recent holidays, contracts placed during the past week in the west were very light, aggregating only 983 tons. Some business is being held up in Chicago pending a settlement of the building trades strike. Chicago fabricators are well supplied with business for the time being, but a prolonged dull season would undoubtedly precipitate severe competition.

Fabricators in the Pittsburgh district are taking a large number of small orders, but no contracts involving heavy tonnages have been placed this week. Deliveries are much better than they were a few weeks ago and are expected to continue to improve.

STRUCTURAL AWARDS.

University of California, Sather Tower, Berkeley, Cal., 479 tons to the California Construction Co.

The Texas Company, warehouse, Port Arthur, Texas, 385 tons.

Ottawa Contractors, Ltd., government wharf and retaining wall at Hamilton, Ont., 600 tons of steel piling to Lackawanna Steel Co.

Smith & Wilson store and loft, Buffalo, 900 tons, to Buffalo Structural Steel Co.

Track elevation, Santa Fe Railroad, Wichita, Kan., 350 tons, Jones & Laughlin Steel Co.

Telephone building, Memphis, Tenn., 500 tons, Riverside Bridge Co.

Addition to plant, Diamond Alkali Co., Fairport Harbor, O., 300 tons, Jones & Laughlin Steel Co.

CONTRACTS PENDING.

Section No. 1 of the Broadway-Fourth avenue subway between Fourteenth and Twenty-sixth streets, New York City, about 3,000 tons. Bids asked.

Printing building, Hill Publishing Co., Thirty-sixth street and Tenth avenue, New York City, 3,600 tons. Action on steel being revised. Geo. A. Fuller Construction Co. has general contract.

Three 20-story loft buildings for Down Town Construction Co. at 285 Fifth avenue. Estimated to require 8,000 to 10,000 tons. Plans filed.

Apartment, Levy Construction Co., Seventy-second street and Park avenue, New York City, 900 tons. Bids entered.

Art museum, Cleveland, 1,400 tons, bids close July 12. Crowell & Sherman have general contract.

Bids were opened yesterday for the Jenss Bros. building at Niagara Falls, N. Y., taking about 400 tons, contracts to be awarded later. Bids will soon be taken for the Union Carbide Co.'s Canadian plant, at Welland, Ont., to cost about $750,000.

Bids will be taken Aug. 1 for $90,000 brick and steel construction School No. 60, Howard L. Beck, Buffalo, city architect. Temple Beth Zion will construct a school and auditorium. L. J. Kopald, rabbi, Buffalo, Colson & Hudson, architects, details later.

Gordon & Madden, Rochester, architects for $165,000 school to be erected there in fall and for addition to school No. 10 on which bids will be opened July 10.

New plans are being prepared by Kenneth M. Murchison, 101 Park avenue, New York, for the Lackawanna railroad's new $400,000 passenger station, 100 x 200, to be erected at Buffalo.

Buildings for Rio Janeiro, Brazil, 2,000 tons. Bids asked.

SHIP BUILDING WORK.

Plate requirements for government colliers Kanawha and Maumee, 5,500 tons, now finally awarded to Worth Bros. Co.

Shape requirements for government colliers Kanawha & Maumee, 1,500 tons, awarded to Jones & Laughlin Steel Co. Bulb angles and bars, about 500 tons, awarded Carnegie Steel Co.

Death of General Grubb

Gen. E. Burd Grubb, who had been actively identified with the control and development of the Cornwall ore banks in Lancaster county, Pa., which at one time were owned exclusively by his family, died July 7 at an hospital in Newark, N. J., where he had recently undergone an operation. He was a native of Burlington, N. J., and was 62 years of age. His great grandfather, Col. Peter Grubb, who was one of George Washington's staff, owned the Cornwall ore banks, the title to which was received direct from William Penn. Gen. Grubb's father, Edward Burd Grubb, who was a native of Lancaster, Pa., succeeded to these iron properties and became an extensive miner of iron ores and a manufacturer of pig iron. He died in 1867, at Burlington, N. J., where he had resided many years. Upon the death of his father, Gen. Grubb assumed the management of the family iron interests in Dauphin, Lancaster and Lebanon counties. He lost his fortune in 1885, but two years later a brother died and left him considerable property, with which he resumed his activities in the iron business. Later the iron firm of Kauffman & Co., of which he was a member, failed. Gen. Grubb, personally, assumed the obligations of the firm and pledged his property to that purpose. After several years of trying struggle, he was successful and, to a considerable extent, he rehabilitated his personal fortune. At one time, he was president of and operated the Lebanon Valley blast furnace of the Lebanon Valley Furnace Co., at Lebanon. Title to most of the Cornwall ore banks is now held largely by the Pennsylvania Steel Co. and by several other iron and steel manufacturers. Gen. Grubb had had a distinguished career as a soldier and diplomat. His family was very prominent socially. He served in the civil war and was breveted brigadier general for his record before Petersburg. He was an unsuccessful candidate for governor of New Jersey in 1889. He served as minister to Spain in President Harrison's administration.

Leetonia Steel Co. Fails

Pittsburgh, July 9. (By wire.)—W. H. Hepburn, president of the People's Bank, Lisbon, O., was appointed receiver of the Leetonia Steel Co., a new $2,000,000 corporation, of which A. T. Meyers, of Pittsburgh, is president. The company, several officers of which were previously connected with the sheet mills, Pittsburgh, recently took over the Salem Iron Co. and had begun the erection of a steel plant to cost more than $1,000,000. Mr. Meyers this morning said that the work of construction undoubtedly would continue under the receivership. Mr. Meyers says that the failure resulted from the troubles of the First-Second National Bank.

Bank Failure Discussed

The closing of the First-Second National Bank of Pittsburgh, July 7, has been the main topic of conversation among steel company officials in that district. The Pittsburgh clearing house has given assurance that the banking situation in that city is sound and officials of the closed bank believe the present situation will be a temporary one. Although the steel trade was not directly affected, the closing of the Pittsburgh bank, together with the financial situation throughout the country, may cause further hesitancy on the part of consumers in covering future needs.

Adopt New Quotation

Pittsburgh, July 9. (By wire.)—Following the report from the east that ferro-manganese had been reduced to $58.50, seaboard, dealers here announced that they would adopt the new quotation. Ferro-manganese has been quoted at $61, seaboard, since April 1.

MUCH DEBATE

Expected on Tariff Bill — Senator Cummins' Substitute.

Washington, July 8.—Senator Cummins, of Iowa, has prepared a draft of a metal schedule to substitute for that revised by the senate finance committee and approved by the Democratic caucus. It is understood that its rates are a compromise between those of the Payne bill and those of the schedule as framed by the Democrats in the senate.

Much debate is ahead for the bill when it gets into the senate, which is expected to be some time this week. Democratic leaders have said that it ought to be ready for the president's signature by Sept. 1, but leaders of the minority say there is no probability of such a thing. They place the date at several weeks later.

Senator Smoot, of Utah, has prepared a number of schedules he will submit in place of the Democratic schedules, and Senator LaFollette, of Wisconsin, has also drawn some. Both these senators and Senator Cummins are expected to occupy a long time in debate on the bill. It is said that Senators Cummins and LaFollette will require at least a week each. Senator Smoot's time will in all probability require this long, if not longer.

Disaffection in Democratic ranks over the bill is not lacking. Forty-five Democrats have pledged themselves unconditionally to support the bill as approved by the caucus. They will vote for no amendments unless ratified by the finance committee or the caucus.

Senators Newlands, of Nevada, and Shafroth, of Colorado, refused to be bound by the caucus, although they said they propose to support the bill. Senators Thornton and Ransdell, because of the free sugar provision, have refused to support the bill as approved by the caucus. Senator Hitchcock, of Nebraska, purposely was absent from the caucus when pledges were asked because his amendment imposing a graduated tax on the manufacture of tobacco was rejected. Senator Culberson, of Texas, is ill in Atlantic City, but will support the bill.

Including the qualified promises of Senators Newlands and Shafroth, the Democratic leaders are two short of a majority. They say they will get 49 votes out of the entire 51 of the majority side, which would afford a majority of two. Defection of only one vote to the Republican side would create a tie, requiring the vote of the vice president to decide it in favor of the Democrats. Apprehension is plainly shown by Democratic leaders, although efforts are apparently being made to conceal the fact. They not only failed to insure a majority vote through caucus action, but were unsuccessful in their attempt to adopt a resolution binding the party to entire acceptance of the bill. In place of this resolution a substitute was offered and adopted. It declares the bill a party measure and provides that those voting for it shall support it absolutely, voting for no amendment unless approved by the caucus of the finance committee.

In order to conciliate Senator Walsh, of Montana, he was allowed to dictate the time when free raw wool should become effective, the date as a result being changed from Oct. 1, recommended by the committee, to Jan. 1. There is no question that the situation faced by the Democrats is serious.

RATE REDUCED

On Iron and Steel Bars, Plates, Sheets and Shapes to Denver.

Washington, July 8. — Beginning Sept 1, 1913, a rate not exceeding 45 cents per 100 pounds on iron and steel bars, steel plates and steel sheets, and structural steel, fabricated or unfabricated, must be established by railroads on shipments to Denver from St. Louis and other Mississippi river crossings taking the same rates, applicable on traffic originating east of the Mississippi river. The Interstate Commerce Commission has found the rate of 63 cents unreasonable to the extent that it exceeds 45 cents, the opinion having been handed down yesterday.

It is a modified finding and is the outcome of the case of the Vulcan Iron Works against the Atchison, Topeka & Santa Fe Railway Co., et al. In the original report the commission held the carriers were charging a rate which was unreasonable and unduly prejudicial to the extent that it exceeded 52 cents on iron and steel bars and 43 cents on steel plates, steel sheets and structural steel, not fabricated. By the modified decision, all the commodities are given the same classification and no distinction is made in the rate on fabricated and unfabricated material.

While the proceedings were pending, the carriers established a proportional rate of 62 cents, intended to equalize the aggregate charges through St. Louis with the aggregate charges through the Chicago gateway. Fabricators east of the Mississippi river succeeded in having the case reopened on the contention that there should be no difference in the rate on the fabricated material from that on the complainant's unfabricated commodity and that there should be no difference in rate between the unfabricated and fabricated article in any branch of the trade. Manufacturers participating in this contention included the Illinois Steel Co., the Carnegie Steel Co., the Tennessee Coal, Iron & Railway Co., and the American Bridge Co.

The defendants also filed a petition for a rehearing. They contended that the commission erred in prescribing a different rate on bars from that on sheets, plates and structural steel, not fabricated.

ARMOR PLATE PLANT

Proposed by Secretary Daniels—Report Being Revised.

Washington, July 8.—Revision of a report proposing the establishment by the government of an armor plate plant is being made by Secretary of the Navy Daniels. He hopes to have the preliminary report whipped into shape and presented to the senate committee on naval affairs this week.

The draft of the report was prepared by the bureau of ordnance, under the direction of Admiral Twining, at the request of the secretary. Detailed estimates of the money necessary for the establishment and maintenance of the plant, along with designs for its construction and arrangement, accompany the report. These will not be available at present, Mr. Daniels said, but may be soon. The secretary leaves Saturday for California, and will probably have complete reports for the plant ready next fall, he told a representative of THE IORN TRADE REVIEW.

It is proposed to build a complete unit for the manufacture of armor plate, according to Mr. Daniels, the government even supplying its own ore. The output proposed will be sufficient to cover the entire requirements of the navy. Roughly, it has been estimated that the government's annual requirement will be 8,000 tons, although some place the tonnage higher than this.

Not in Trouble.—The Noble Electric Steel Co., with offices at 995 Market street, San Francisco, and plant at Heroult-on-the-Pitt, Shasta county, Cal., advises that there is no foundation to the reports that the company is in financial difficulties.

IRON AND STEEL PRICES

Pig Iron

PITTSBURGH

(Through This Year.)

Bessemer	$16.90
Basic	15.15 to 15.40
No. 2 foundry	14.90 to 15.15
Malleable	15.15
Gray forge	14.65

The feright rate from valley points is 90c.

CLEVELAND

(Through this Year Delivered in City.)

No. 1 foundry	$15.25
No. 2 foundry	14.75
No. 2 southern	14.85 to 15.35
Bessemer	16.90
Silveries 8 per cent silicon	20.55

CINCINNATI

(Through This Year.)

Southern foundry No. 1	$14.25 to 14.75
Southern foundry No. 2	13.75 to 14.25
Southern foundry No. 3	13.25 to 13.75
Southern foundry No. 4	13.00 to 13.50
Southern gray forge	12.75 to 13.25
Mottled	12.75 to 13.00
Southern No. 1 soft	14.25 to 14.75
Southern No. 2 soft	13.75 to 14.25
Standard southern car wheel	27.25 to 27.75
Southern Ohio No. 2	15.45 to 16.20
Southern No. 3	14.95 to 15.70
Southern Ohio No. 4	14.70 to 15.45
Silveries 8 per cent silicon	19.70 to 20.20

(Freight from Ironton, $1.20; from Birmingham, $3.25.)

CHICAGO

(Delivered Chicago, this year, except northern foundry and malleable Bessemer, which are quoted f. o. b. local furnaces.)

Lake Superior charcoal	$16.75
Northern foundry No. 2	15.00
Southern foundry No. 2	14.85 to 15.35
Jackson co. silveries, 8 per cent	20.40
South'n silveries, 5 per cent sil.	17.35
Alabama basic	14.85
Malleable	15.00

PHILADELPHIA

(Prompt and third quarter shipment delivered to consumer's plants, in Philadelphia and vicinity, unless otherwise specified.)

Northern No. 1X foundry	$15.75 to 16.00
Northern No. 2X foundry	15.75 to 16.00
Northern No. 2 plain	15.50 to 15.75
Standard forge (Eastern Pa.)	15.00 to 15.25
Virginia No. 2X	16.30 to 16.50
Southern No. 2	15.20 to 15.50
Standard low phos., Phila	23.25 to 23.50
Lebanon low phos., furnace	18.75 to 19.00
Malleable	16.25 to 16.50
Basic (Eastern and Central Pa.)	15.50

NEW YORK

(Prompt and third quarter delivery, prices based at Jersey City and tidewater.)

Northern No. 1X foundry	$15.75 to 16.00
Northern No. 2X foundry	15.50 to 15.75
Northern No. 2 plain	15.25 to 15.50
Virginia No. 2X	16.30 to 16.80
Southern No. 2	15.25 to 15.75
Malleable	15.75 to 16.00
Gray forge	15.00 to 15.25

ST. LOUIS

(Throughout this year.)

Southern No. 1	$14.75 to 15.25
Southern No. 2	14.25 to 14.75
Southern No. 3	13.75 to 14.25
Southern No. 4	13.25 to 13.75

(Freight, Birmingham to St. Louis, $3.75)

BIRMINGHAM

(For southern delivery.)

No. 1 foundry	$11.50
No. 2 foundry	11.00
No. 3 foundry	10.50
No. 4 foundry	$10.25
Gray forge	10.25
Mottled	10.25
Standard basic	11.50
Off basic	11.00
Charcoal	25.00

BUFFALO

(Through this year, delivered in city.)

No. 1 foundry	$14.00 to 14.25
No. 2X foundry	14.00
No. 2 plain	13.75
No. 3 foundry	13.75
Gray forge	13.75
Malleable	14.00 to 14.25
Basic	14.00 to 14.50
Charcoal	16.00 to 17.00

Ferro Alloys

English 80 per cent ferro-manganese, $58.50, seaboard, early and forward.

Fifty per cent ferro-silicon on contracts, $75, Pittsburgh, or Philadelphia, for carloads; $74 for larger lots and $73 for 600 tons or more. Twelve to 13 per cent, $26. Eleven to 12 per cent, $25. Ten to 11 per cent, $24. Nine to 10 per cent, $23, f. o. b. Globe Jisco and Ashland furnace. Freight to Pittsburgh, $1.90.

Ferro-carbon titanium 8 cents per pound for carload lots; 10 cents per pound for 2,000-pound lots and over; 12½ cents per pound in lots up to 2,000 pounds.

Freight rates on ferro-manganese, foreign spiegeleisen and electrolytic ferro-silicon from Baltimore to Pittsburgh, $2.16; to Youngstown, $2.48; to Cleveland, $2.57; to Detroit and Columbus, $2.99; to Cincinnati, $3.40; to Chicago and Milwaukee, $4.00. Freights from Philadelphia and New York, 10 and 30 cents higher respectively.

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 pounds, to:—

New York	16 cents
Philadelphia	15 cents
Boston	18 cents
Buffalo	11 cents
Cleveland	10 cents
Cincinnati	15 cents
Chicago	18 cents
St. Louis	22½ cents
Denver	84½ cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, shapes and plates	80 cents
Pacific coast, sheets, No. 11 and heavier	80 cents
Pacific coast, sheets, Nos. 12 to 16	85 cents
Pacific coast, sheets, No. 16 and lighter	95 cents
Pacific coast, wrought pipe and boiler tubes	65 cents

Coke

AT THE OVENS.

		Prompt shipment.	Contract.
Connellsville district:			
Foundry	coke	$2.85 to 3.10	$3.00 to 3.10
Furnace	coke	2.50	2.50
Wise county district:—			
Foundry	coke	$2.60 to 2.75	$2.75 to 3.00
Furnace	coke	2.25 to 2.50	2.25 to 2.50
Pocahontas district:—			
Foundry	coke	$2.75 to 3.00	$2.75 to 3.00
Furnace	coke	2.35 to 2.50	2.50
New River district:—			
Foundry	coke	$3.25 to 3.50	$3.25 to 3.50
Furnace	coke	2.50 to 2.60	2.60 to 2.90

Iron Ore

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, $4.40; Mesabi Bessemer, $4.15; old range non-Bessemer, $3.60; Mesabi non-Bessemer, $3.40; all at lower lake ports.

Foreign iron ores, 7½ to 8 cents per unit, f. o. b. cars eastern seaboard. Freight rates from Philadelphia to eastern Pennsylvania furnace points range from 35 to 75 cents per ton.

Semi-Finished Material

PITTSBURGH

For prompt and forward delivery Bessemer 4 x 4 billets with 0.25 carbon and less, $26.50 to $27.00; open-hearth rolling billets, $26.50 to $27.00; Bessemer sheet and tin bars, $27.50; open-hearth sheet bars, $27.50, f. o. b. Pittsburgh and Youngstown. Forging billets, $33, Pittsburgh. Wire rods, $29 to $30; muck bar, $31, Pittsburgh.

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity: 4 x 4-inch open-hearth and Bessemer rolling billets at $28 to $29, and forging billets at from $33 to $35.

Standard Shapes

PITTSBURGH

Standard structural shapes, 1.45c. For extras see card of Sept. 1, 1909.

CHICAGO

Standard structural shapes, 15 inch and under, 1.63c.

PHILADELPHIA

Delivered to consumers in Philadelphia and vicinity. Standard structural shapes from Eastern Pennsylvania mills 1.60c to 1.65c. From Pittsburgh mills 1.60c.

NEW YORK

Standard structural shapes delivered at New York by eastern Pennsylvania makers 1.61c to 1.66c. On forward delivery, Pittsburgh district makers are quoting from 1.61c to 1.66c, New York.

Plates

PITTSBURGH

Standard steel plates ¼ inch thick, 6¼ to 100 inches, 1.45c. For extras, see card of Sept. 1, 1909.

CHICAGO

Tank plates, 1¼ inch thick, 6⅝ to 100 inches wide, 1.63c.

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity. Tank plates from eastern Pennsylvania mills for prompt or forward delivery 1.65c to 1.75c. From Pittsburgh mills, tank plates 1.60c to 1.65c.

NEW YORK

Steel plates, tank quality, for prompt and forward delivery at New York by eastern Pennsylvania makers, 1.66c to 1.76c on third quarter and last half contracts. Pittsburgh

makers are quoting 1.61c to 1.66c, New York.

Sheets and Tin Plate

PITTSBURGH

No. 28 black	2.25c to 2.35c
No. 28, tin mill black	2.30c
No. 28, galvanized	3.35c to 3.50c
No. 10, blue annealed	1.75c
No. 28 painted corrugated	2.45c to 2.55c
No. 28 galvanized, corrugated	3.40c
Tin plate, 100 pound cokes	$3.60

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity: No. 10 gage annealed sheets at 1.90c.

Pipe and Boiler Tubes

PITTSBURGH

	Black, Butt.	Galv. Weld.
Steel ¾ to 3 inches	79	70½
Iron, ¾ to 2½ inches	72	61
BOILER TUBES.		
Steel, 3½ to 4½ inches	69	..
Iron, 3½ to 4½ inches	58	..

Other sizes of pipe and tubes take the usual advances as per official cards.

Rails and Track Material

PITTSBURGH

Steel rails, 50-pound and heavier, 1.25c per pound for Bessemer and 1.34c for open-hearth; carload lots less than 500 tons 1.34c per pound; light rails on base weight of 40 to 45 pounds, 1.25c schedule on the other weights being irregular and subpect to negotiations; angle bars for standard sections, 1.50c, base, Pittsburgh; track bolts, 2.40c base, Pittsburgh.

Railroad spikes. 4½, 5 and 5½ and 9-16 inch, 1.70c to 1.80c.

CHICAGO

Light rails, carloads, 25 to 45-pound, 1.25c, base; 16 to 20-pound, 1.30c; 12-pound, 1.35c; 8-pound, 1.40c.

Light section relayers, 45 pounds and under, subject to inspection, $22 and $23; standard section relaying rails, subject to inspection, $23 to $24.

Track fastenings, f. o. b. Joliet:

Angle bars, 1.50c; railroad spikes, 1.80c to 1.85c; smaller size spikes, 1.90c, base; track bolts, with square nuts, 2.30c to 2.40c.

Bars, Hoops and Bands

PITTSBURGH

Common iron bars, 1.65c to 1.70c, Pittsburgh; Bessemer and open-hearth steel bars, 1.40c; plow and cultivator 1.40c; channels, angles, zees, tees, under 3 inch, 1.50c, all f. o. b. mill.

Hoops in carload lots, 1.60c, Pittsburgh, in less than carload lots, 1.65c; bands, 1.40c, base, with net extras, as per standard steel.

Cold rolled and ground shafting, 60 per cent off in carloads and 55 per cent in less than carloads delivered in base territory.

CHICAGO

Bar iron 1.50c to 1.55c; hard steel bars rerolled, 1.55c; soft steel bars, bands and small shapes, 1.58c; hoops, 1.63c; smooth finished machinery steel, 1 inch and larger, 1.78c; shafting, 58 per cent off list for carload lots, 53 per cent off for less than carloads.

PHILADELPHIA

Delivered in consumers' plants in Philadelphia and vicinity: Steel bars 1.55c to 1.60c on contract and common bar iron, 1.47½c to 1.52½c. Prompt steel bars on mill shipments, 1.85c to 1.90c, delivered. Cut nails 1.90c to 1.95c, Philadelphia. Shafting 60 and 58 and 55 and 53 off in base territory.

NEW YORK

Delivered in New York, steel bars on contract from 1.56c to 1.61c, and common iron bars, 1.45c to 1.55c.

Bolts, Nuts and Rivets

Rivets

Button head structural rivets, 2.10c, Pittsburgh, cone head boiler rivets, 2.20c. Small rivets, 75, 10 and 10 off.

Structural rivets, Chicago, 2.08c; boiler rivets, 0.10c extra.

Bolt and Nut Discounts

(Delivered within a 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, smaller and shorter, rolled threads, 75 and 10; cut threads 75 and 5; larger and longer, 70 and 2½.

Machine bolts with hot pressed nuts, ⅜ x 4 inches, smaller and shorter, rolled 75, 10, and 5; cut, 75 and 10; larger and longer, 70 and 7½.

Gimlet and cone point lag or coach screws, 80 and 10.

Hot pressed square, blank or tapped nuts, $5.70 off list; hot pressed hexagon blank or tapped, $6.30.

Cold pressed C. & T. square, blank or tapped, $5.70 off; hexagon, blank or tapped, ⅝-inch and larger, $6.60 off; ½-inch and smaller, $7.20 off.

Wire Products

PITTSBURGH

Wire nails, jobbers' carload lots, $1.70 to $1.80, retailers' carload lots, $1.75 to $1.85, cut nails (western makers), jobbers' lots, $1.70; painted barb wire, jobbers' carload lots, $1.70 to $1.80; retailers' carload lots, $1.75 to $1.85; plain wire to jobbers in carloads, $1.50 to $1.60; and to dealers in carloads, $1.55 to $1.65; polished staples, $1.70 to $1.80; galvanized staples, $2.10 to $2.20.

CHICAGO

Wire nails, jobbers' carload lots, $1.98; retailers' carload lots, $2.03; retailers' less than carload lots, $2.08; painted barb wire, jobbers' carload lots, $1.98; retailers' carload lots, $2.03; retailers' less than carload lots, $2.08, with 40c for galvanizing; plain wire, jobbers' carload lots, $1.73; retailers' carload lots, $1.78.

Cast Iron Pipe

CHICAGO

Four-inch water pipe, $28; 6 to 12 inches, $27; larger sizes, $25; gas pipe, $1 a ton higher.

NEW YORK

Six-inch pipe, 30 pounds to the foot, $23 to $25, f. o. b. New York, in carload lots.

BIRMINGHAM

Water main: 4-inch, $21.50; 6-inch and up, $20.50. Gas main: $1 per ton higher than water main. Special fittings, $42.50 to $47.50.

Old Material

PITTSBURGH

(Gross tons delivered.)

Heavy melting scrap	$12.50
Rerolling rails	14.50 to 15.00
Malleable	11.50 to 11.75
Bundled sheet scrap	9.00 to 9.25
Iron axles	24.00 to 24.50
Old iron rails	14.00 to 14.50
Stove plate	9.00 to 9.25
No. 1 wrought scrap	14.00 to 14.50
Old car wheels	13.00 to 13.25
Low phosphorus	15.00 to 15.50
Machine shop turnings	6.50 to 7.00
No. 1 busheling	11.50 to 12.00
Cast borings	8.25 to 8.50
No. 1 cast scrap	12.50 to 13.00

PHILADELPHIA

Gross tons delivered to consumers' plants in eastern Pennsylvania and western New Jersey:

Old iron rails (nominal)	$17.00 to 17.50
Old steel rails (rerolling)	14.50 to 15.00
No. 1 heavy melting steel	11.25 to 11.75
Old car wheels	12.50 to 13.00
Old iron axles (nominal)	25.00 to 26.00
Old steel axles (nominal)	17.50 to 18.00
No. 1 railroad wrought	14.50 to 14.75
Wrought pipe	11.00 to 11.50
Cast borings	8.00 to 8.50
Machine shop turnings	8.00 to 8.50
Heavy cast (broken)	13.00 to 13.50
Malleable	12.00 to 12.50
Stove plate	9.50 to 10.00
No. 1 forge	10.00 to 10.50
Low phosphorus	15.75 to 16.25

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock, Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Coatesville, Pa.; $0.65 to Bethlehem, Pa., Reading, Pa., and Roebling, N. J.; $1.10 to Pottsville, Pa., Lebanon, Pa., and Columbia, Pa.; $1.20 to Harrisburg and Steelton, Pa.; $1.40 to Milton, Pa.

CLEVELAND

Gross Tons

Old iron rails	$15.00
Old steel rails (under 3 ft.)	13.00 to 13.50
Old steel rails (over 6 ft.)	12.75 to 13.25
Relaying rails	23.00 to 25.00
Old steel boiler plate	9.00 to 9.50
Malleable iron (railroad)	11.75 to 12.00
Axle turnings	8.00 to 8.50
Steel axles	18.00 to 19.00
Malleable iron (agricultural)	9.00 to 9.50
Heavy steel	11.00 to 11.25
Country mixed steel	9.00 to 9.50
Bundled sheet scrap	8.00 to 8.50

Net Tons

No. 1 R. R. wrought	$11.50 to 12.00
No. 1 busheling	9.50 to 9.75
No. 1 machine cast	10.50 to 11.00
No. 1 dealers' wrought	9.00 to 9.50
Machine shop turnings	4.00 to 4.25
Pipes and flues	7.50 to 8.00
Wrought drillings	4.00 to 4.25
Cast borings	5.75 to 6.25
Stove plate	7.75 to 8.25
Wrought iron arch bars	16.00
Wrought iron piling plate	14.00

CHICAGO

(Delivered in consumers' yards.)

Gross Tons.

Old car wheels	$13.50 to 14.00
Old iron rails	13.75 to 14.25
Rerolling rails (5 ft. and over)	12.00 to 12.50
Old steel rails (3 ft. and und.)	11.00 to 11.50
Frogs, switches and guards	10.50 to 11.00
Heavy melting steel	10.50 to 11.00
Shoveling steel	10.00 to 10.50

Net Tons.

No. 1 R. R. wrought	$10.50 to 11.00
No. 2 R. R. wrought	9.75 to 10.25
Arch bars and transoms	13.50 to 14.00
Knuckles, couplers and springs	10.75 to 11.25
Shafting	14.25 to 14.75
Iron car axles	19.50 to 20.00
Steel car axles	16.50 to 17.00
Locomotive tires	12.00 to 12.50
Dealers' forge	10.00 to 10.50
Pipe and flues	7.25 to 7.75
No. 1 cast	10.75 to 11.25
No. 1 busheling	8.50 to 9.00
No. 2 busheling	6.50 to 7.00
No. 1 boiler cut	8.25 to 8.75
Boiler punchings	12.00 to 12.50
Cast and mixed borings	4.50 to 5.00
Machine shop turnings	4.75 to 5.25
Railroad malleable	11.00 to 11.50
Agricultural malleable	10.00 to 10.50
Angle bars, splices, etc., iron	13.50 to 14.50
Angle bars, steel	10.00 to 10.50
Stove plate and light cast scrap	8.75 to 9.25

NEW YORK

Gross tons, New York dealers' prices at tidewater, usually, for Eastern Pennsylvania delivery:

Old car wheels (nominal)	$10.50 to 11.00
Steel axles	15.00 to 15.50
Old steel shafting	13.50 to 14.00
No. 1 heavy melting steel	9.00 to 9.25
No. 1 R. R. wrought	12.00 to 12.50
Wrought pipe (not galvanized)	8.25 to 8.75
Cast borings	5.50 to 5.75
Machine shop turnings (nom.)	5.50 to 5.75
Heavy cast	11.25 to 11.50

Stove plate	$7.50 to 7.75
Grate bars (nominal)	6.00 to 6.50

Freight rates on scrap per ton to Steelton, Pa., Columbia, Pa., Pottsville, Pa., and Harrisburg, Pa., are $1.50 from Jersey City, and $2.00 from New York; to Coatesville, Pa., Ivy Rock, Pa., Phoenixville, Pa., and Reading, Pa., $1.50 from Jersey City, and $1.80 from New York; to Bethlehem, Pa., $1.10 from Jersey City, and $1.60 from New York; to Roebling, N. J., $1.00 from Jersey City, and $1.50 from New York; to Milton, Pa., $1.60 from Jersey City, and $2.00 from New York; to Jersey City, $1.00 from New York; to Newark, $1.10 from New York.

CINCINNATI

Gross Tons.

Old iron rails	$11.50 to 12.00
Old steel re-rolling	10.00 to 10.50
Old iron axles	16.00 to 16.50
Heavy melting scrap	9.50 to 10.00
Relaying rails	18.75 to 19.25

Net Tons.

Old No. 1 R. R. wrought	$9.00 to 9.50
Bundled sheet scrap	5.50 to 6.00
No. 1 yard wrought	6.75 to 7.25
No. 1 machine cast	9.50 to 10.00
No. 1 busheling	7.00 to 7.50
Stove plate	6.75 to 7.25
Machine shop turnings	5.00 to 5.50
Cast borings	4.50 to 5.25
Heavy turnings	5.25 to 5.75
Mixed cast	7.75 to 8.25
Breakage	5.50 to 6.00
Malleable	7.00 to 7.50

BIRMINGHAM

Old iron axles, (light)	$15.00 to 15.50
Old steel axles, (light)	15.00 to 15.50
Old iron rails	13.50 to 14.00
No. 1 R. R. wrought	12.00 to 12.50
No. 2 R. R. wrought	10.00 to 10.50
No. 1 country wrought	9.50 to 10.00
No. 2 country wrought	8.50 to 9.00
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	10.50 to 11.00
Tram car wheels	10.50 to 11.00
Standard car wheels	12.00 to 12.50
Light cast and stove plate	8.25 to 8.75

BUFFALO

(Gross tons.)

Heavy melting steel	$11.00 to 11.50
No. 1 R. R. wrought scrap	13.00 to 13.50
No. 1 R. R. and mch. cast scrap	13.00 to 13.50
Old steel axles	17.00 to 17.50
Old iron axles	22.50 to 23.00
Car wheels	13.00 to 13.50
Railroad malleable scrap	12.50 to 12.75
Wr'ght iron and soft steel turn.	6.00 to 6.50
Cast iron borings	6.00 to 6.50
Low phos. steel scrap	16.50 to 17.00
Old iron rails	15.00 to 15.50
Boiler plate, sheared	13.00 to 13.75
Bundled sheet scrap	8.50 to 9.00
Stove plate (net ton)	9.75 to 10.00
Locomotive grate bars	10.00 to 10.50
No. 1 busheling scrap	10.50 to 11.00
No. 2 busheling scrap	8.00 to 8.50

ST. LOUIS

(Dealers' buying prices.)

Gross Tons

Old car wheels	$11.50 to 12.00
Old iron rails	11.00 to 11.50
Rerolling rails (5 ft. and over)	12.00 to 12.25
Old steel rails (3 ft. and und.)	10.50 to 11.00
Light sec. relayers (45 pounds and und.) subject to inspec.	23.50 to 24.50
Relaying rails, subject to inspec.	23.50 to 24.50
Frogs, switches and guards	10.00 to 10.50
Heavy melting steel	9.50 to 10.00
Shoveling steel	9.00 to 9.25

Net Tons

No. 1 railroad wrought	$9.00 to 9.50
No. 2 railroad wrought	8.25 to 8.75
Arch bars and transoms	12.00 to 12.50
Knuckles, couplers, springs	9.00 to 9.50
Shafting	13.00 to 13.50
Steel car axles	15.00 to 15.50
Iron car axles	17.50 to 18.00
Locomotive tires	9.50 to 10.00
Pipe and flues	5.50 to 6.00
Tank iron and cut boilers	6.50 to 7.00
No. 1 cut busheling	7.50 to 8.00
Cast and mixed borings	3.50 to 4.00
Machine shop turnings	5.00 to 5.50
Railroad malleable	7.50 to 8.00
Agricultural, malleable	6.50 to 7.00
Stove plates	7.00 to 7.50
Angle splice bars (iron)	10.00 to 10.50
Angle splice bars (steel)	9.00 to 9.50

Store Prices

CINCINNATI

Steel bars 2c; iron bars, 1.90c; plates and shapes, 2.10c; sheets, blue annealed No. 10, 2.40c; black, No. 28, 2.85c; galvanized, No. 28, 3.95c; cold rolled shafting, round, square, hexagon and flat, 50 off.

CLEVELAND

Steel bars, 2.00c; plates and shapes, 2.10c; iron bars, 2.00c; sheets, No. 10 blue annealed, 2.40c; No. 28 black, 2.85c; No. 28 galvanized, 3.95c.

CHICAGO

Steel bars, 1.85c; iron bars, 1.85c; hoops, 2.50c; shapes and plates, 1.95c; No. 10 blue annealed sheets, 2.25c; black, No. 28, 2.90c; galvanized, No. 28, 4.15c.

PHILADELPHIA

Steel bars 2.05c to 2.10c; structural shapes, 2.00c to 2.10c; plates, 2.00c to 2.10c.

NEW YORK

Steel bars, 2.05c; structural shapes, 2.15c; plates, 2.15c.

Navy Yard Employes Granted Advance

Washington, July 9. (By wire.)—Assistant Secretary of the Navy Roosevelt yesterday afternoon approved an order granting a wage increase of seven and eight tenths per cent to employes of the Washington navy yard, effective July 1, this year, and continuing till Jan. 1, 1914. This action follows the complaint of machinists and others who claimed that Commandant Jones was not fairly distributing $240,000 appropriated by congress for a 10 per cent increase to benefit all employes. The machinists said the increase has been made on efficiency regardless of the fact that the appropriation carried no such qualification. The wages conference begins here today between Secretary Daniels and commanders of all navy yards on the Atlantic coast save the Philadelphia yard.

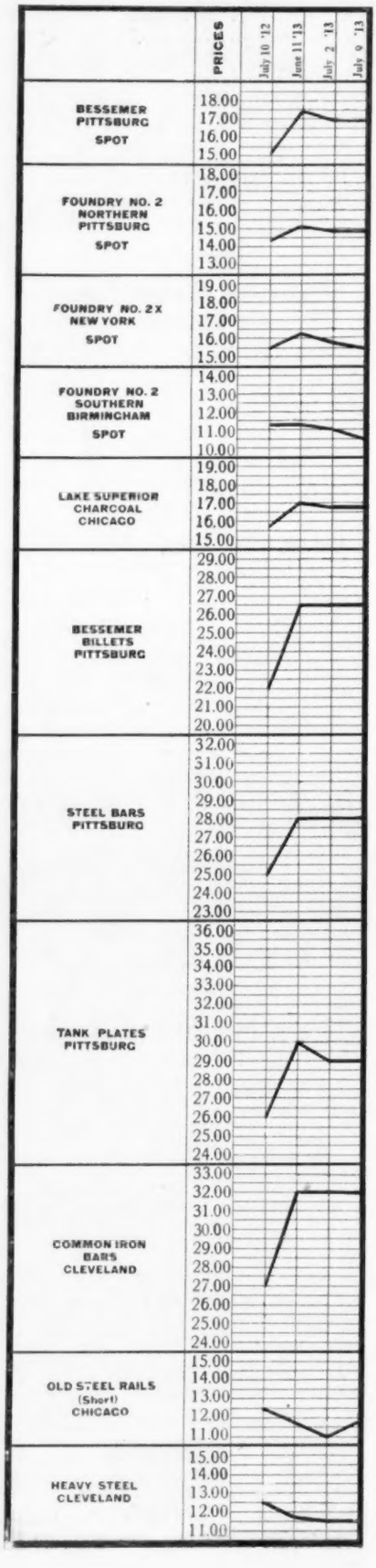
Lake Erie Receipts

Out of a total iron ore movement of 7,974,444 tons during June, 6,214,648 tons were received at Lake Erie ports, distributed as follows:

Port.	June, 1913.
Buffalo	932,468
Erie	106,145
Conneaut	1,276,678
Ashtabula	1,234,521
Fairport	379,460
Cleveland	1,416,106
Lorain	612,071
Huron	104,768
Sandusky	.....
Toledo	127,848
Detroit	24,583
Total	6,214,648

The organization is announced of the Canadian Nickel Corporation, in which prominent London and Toronto financiers are interested.

PRICE CHART



The New Engineering Buildings at Minnesota

Description of the Experimental Engineering Laboratory for the College of Engineering at the University of Minnesota

A new experimental engineering laboratory recently has been built for the college of engineering at the University of Minnesota, Minneapolis. It is a part of a general scheme of vast proportions designed by Cass Gilbert, architect, New York, for the extension and improvement of the university. To carry out the project, the regents some years ago acquired a large tract of land lying between the present college buildings and the Mississippi river, 10 acres of which have been set aside as a special campus for the college of engineering. Here, eventually, 10 engineering buildings will be erected; nine of them form a square surrounding the main engineering building which has also been recently completed. The engineering campus lies north of Washington avenue and is accessible by the interurban electric railway which connects Minneapolis and St. Paul. It is just 20 minutes from the business section of Minneapolis and 40 minutes from that of St. Paul.

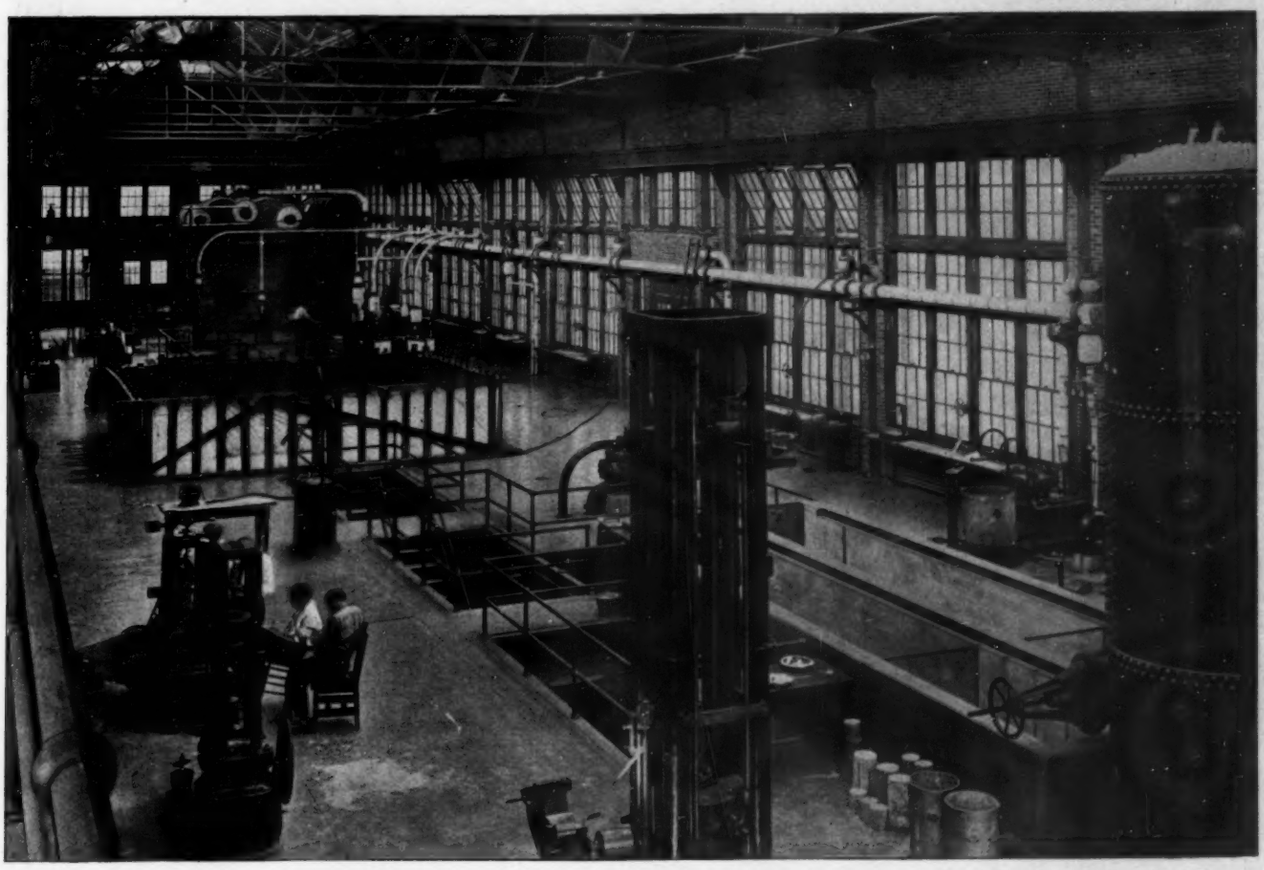
The experimental engineering building is located on the east margin of the engineering campus on Union street. Its front entrance looks to the westward toward the symmetrical entrance of the main engineering building. It is 231 feet long and 65 feet in least width with two wings containing offices and recitation rooms reaching toward the wings of the main engineering building. This arrangement carries out the suggestion of a secondary quadrangle. The building has a basement and two stories.

Architecture of Building

The architectural style is Italian renaissance and the materials used are brick in masses with stone up to the basement windows and in the cornice and trimmings. The brick is laid in Dutch bond, with ¾-inch joints hollowed out. The combination of Colonial brick and Bedford stone is most attractive, the reds and purples of the brick giving a warmth of tone very grateful in the latitude of Minnesota.

The main room in the body of the building has inside dimensions of about 57 x 227 feet. It is entirely without columns or other obstructions and is provided with skylights in the roof in addition to the ordinary windows. The walls are of buff enameled brick and the cement floor is Nile green. This combination of colors makes the room attractive as a place in which to work. The main floor is concrete, heavily reinforced and so designed that an engine or large machine may be placed anywhere without considering any further foundations or supports. A number of hatchways or openings which are cut through the middle of the main floor aid in lighting and ventilating the basement and are also useful in setting up special apparatus.

In one corner is a 150-horsepower water tube boiler carrying 250 pounds per square inch pressure; this provides steam to a main leading southward along the east wall the full length of the building. Immediately adjacent to the boiler are experimental engines, then come steam-operated pumps, motor-driven pumps, a hydraulic tank and weir



NORTH END OF LABORATORY, SHOWING THE BOILERS AND STEAM ENGINE TESTING FLOOR

and water measuring devices of various kinds.

In the southwest corner is a big materials-testing machine for breaking full size beams and columns, and around it are grouped smaller machines of the same kind. Toward the north end of the room on the west side are gas and gasoline and heat engines of various types, and opposite the boiler in the northwest corner is a testing floor where engines, motors, automobiles, etc., may be brought in for tests and experimentation. A 10-ton crane which travels the full length of the building facilitates handling heavy weights on the laboratory floor. In the basement are rooms for testing road materials, cement and concrete, a wash room with shower baths, a locker room, store rooms and research and thesis rooms.

On the second floor level is a balcony overlooking the main floor, with which are connected recitation and computing rooms and the museum of broken specimens.

Although the experimental building is designed primarily for the instruction of the students at the university, plans are being formulated for a larger use of the laboratory as an experiment station working for the higher efficiency of industrial, municipal and state enterprises in Minnesota.

The main engineering building, which has been erected adjacent to the experimental laboratory, is a three-story structure, 231 feet long and 65 feet wide, with two wings on the east side, each 70 x 40 feet. The north wing is occupied by the engineering library and the south wing contains three large drafting rooms. The basement is utilized for student welfare rooms, lockers, toilets, blue print, storage and research rooms and instrument and calibration rooms for the civil engineers. The basement under the north wing is used as a stack room in connection with the library, and has a capacity of 40,000 volumes.

The first floor is largely devoted to recitation and lecture rooms, and to the offices of members of the faculty. In addition, the offices of the dean of the college, with adjoining committee room and special light and dark lecture rooms adapted to the use of technical societies, are centralized on this floor.

HYDRAULIC APPARATUS IN THE SOUTH END OF THE LABORATORY

Engineering Library

In the north wing, as previously stated, is the engineering library, one of the largest in the northwest. This room extends through two floors, with a balcony at the level of the second floor, and has overhead skylight. On the first floor the alcove system is used. All second-story windows are blanked, so that the whole outside wall space is devoted to book shelves. The balcony is made additionally useful and attractive by reading desks on all four sides. The library is finished in fumed oak with some elaborate carving, while the plaster work, the cornice and ceiling beams are ivory white. The floors are of battleship linoleum laid on concrete slabs and are noiseless. The deep green of the floor covering and balcony rail, with the rich brown of the fumed oak and the white above, give a color scheme of great richness.

The book capacity of the gallery is 10,000 volumes, and that of the first floor is the same. This with the stack capacity of the basement gives an aggregate book capacity of 60,000 volumes.

The second floor is devoted almost exclusively to recitation, lecture, drafting rooms and offices. One of the particular features of this floor are the post-senior engineers' offices. The post-seniors are fifth-year men who have received the degree of bachelor of science in engineering at the end of their fourth year. It was thought that they should receive somewhat more dignified treatment than is accorded to the regular engineering students. In accordance with this view each man has his individual fumed oak desk and his individual place at a drafting table. There are two rooms of this character, one

for the civil and the other for the mechanical engineers. The post-senior electrical engineers have their office in the electrical building. The floors in the corridors on the second and third floors are covered with battleship linoleum, the same as that in the library. The first floor corridor is white ceramic tile with green border.

The north drafting room on the third floor, which is over the post-senior civil room, is devoted to structural and other work of the senior civil engineers. The east rooms are devoted to architectural work. Some lecture rooms and a dark projection room are also provided. The auditorium of the college with a seating capacity of 400 persons is also on the third floor. The building has been constructed with a view of ultimately adding a roof house as the demand for more space for the architectural department becomes apparent.

Features of Construction

Both of the new engineering buildings are fireproof. The floors are reinforced concrete using the mushroom system. The buildings are adequately provided with artificial ventilation on the Plenum system, and the toilet rooms have exhaust ventilation as well. For heating alone, the direct radiation in the rooms is sufficient with the fans at rest. With the fans in motion, however, the air is tempered, washed, heated and forced in generous quantities to every room. The building is electrically-lighted, the drafting rooms and the auditorium utilizing the indirect system. As the main building is in the center of the engineering group, it is provided with entrances at each end and midway on each side.

The Resistance of Steel to Wear[1]

By George L Norris

The increasing speeds and heavy duty of machinery and motive power with resultant shortening of length of service of parts through rapid wear, makes the study of wear-resisting qualities of metals, especially steel, one of increasing importance. In the railway field, the increasing wear of tires and rails due to increased loads and speeds is a serious problem. Not only is it desirable to have high resistance to wear, but it is necessary to have other qualifications, strength and toughness, to insure against failure or breakage. The tests described in this paper were undertaken with the object of studying the relations, if any, between the wear resistance of various steels and the various physical properties of elastic limit, tensile strength, and hardness. Owing to several protracted interruptions, only a relatively small proportion of the tests projected have so far been completed.

Classes of Wear

There are three classes of wear:

1. — Abrasion, such as grinding, to which crushing and excavating machinery is subjected.
2.—Lubricated sliding or rolling friction, such as machine parts, axles, shafting, etc., are subjected.
3. — Dry rolling friction, to which wheels and rails are subjected.

The first class, wear by abrasion, is in many ways less important than the other two. It has, however, been utilized frequently as a means of comparing the wearing qualities of metals for all three classes. The machines for the purpose are some form of grinding machine and the specimens are ground or abraded under a constant pressure for a certain length of time. The amount of metal removed under these conditions determines the relative wearing value.

Investigations of wear by lubricated friction in the past have been largely confined to bearing metals rather than steel. This has been due undoubtedly to the fact that steel is usually worked against soft bearing metals or bronzes.

The investigation of the wear resistance of steel and iron under lubricated friction, however, is growing more important with the increasing severity of the requirements of service.

Probably the most satisfactory device for testing wear under lubricated sliding friction is the Derihon machine, consisting of a hard steel disc revolving in oil, and against the edge of which is pressed the test specimen.

Dry Rolling Friction

The third class, wear by dry rolling friction, is the most important, especially when we consider the vast tonnage of steel in service in the form of rails, wheels and tires.

A machine for investigating wear under dry rolling friction was described by E. H. Saniter in 1908 before the Iron and Steel Institute, and consists essentially of a revolving test specimen which drives by friction the inner ring of a ball bearing, the outer ring of which is stationary and loaded.

The investigations of the author have been confined so far to the third class of wear, dry rolling friction. The machine used is a modification of Dr. Stanton's fatigue testing machine.

This machine consists essentially of three case-hardened rollers, 3½ inches in diameter. The two lower rollers are driven by gears, while the third, upper roller, is driven by friction. The upper roller is carried in the lever by which the load is applied to the test specimen. A load of 1,000 pounds on the specimen is possible with this machine. The rollers each have a groove in the middle, ¼ inch wide, to take the corresponding band on the test specimen and to keep it from lateral motion. If the rollers all revolved at a uniform speed the amount of wear on the test specimen would be very slight, practically nothing, as there would be no slippage of the test specimen. In order to accelerate the wear and approximate as nearly as possible the actual wearing conditions of wheels and rails, the two lower rollers are driven at different speeds to produce a slippage of the specimen. This is accomplished by having two less teeth in one of the driving gears.

The test specimens are 2 inches long and ⅞ inch in diameter; the guide band is ⅛ inch larger in diameter and a scant ¼ inch wide. They weigh about 160 grams and can be accurately weighed on a chemical balance to 1/10 of a milligram. The diameter of the specimens which this machine will take can vary from ⅝ inch in diameter to 1½ inches in diameter, if desired. The driving speed of the machine is 1,000 revolutions per minute, and the speed of the test specimen is about 5,000 revolutions per minute.

Applied Load

The usual run before weighing is 100,000 revolutions of one of the driving rollers, corresponding to practically 500,000 revolutions of the test piece. In the tests included in Tables I and II, the applied load was 224 pounds, or 100 kilograms; except in the cases noted in Table I, the specimens were all turned from rolled bars, 1⅛ inches in diameter.

While the tests show a general decrease in the amount of wear, as the hardness and strength increase, the progression is irregular, and there are several instances where softer steels show less wear than the harder ones, as for example 12 and E-1; C-1 and F-1.

It is evident that the composition of the steel influences the resistance to wear to a considerable degree. Robin

[1]Presented at the Atlantic City meeting of the American Society for Testing Materials.

in his investigations found that nickel, chromium and vanadium each increased the resistance of the steel to wear. Nusbaumer in his tests found remarkable resistance to wear of low carbon tests with manganese about 1.5 per cent. Saniter, on the contrary, did not find increased resistance to wear in the case of the few alloy steels he reported, except for a high manganese steel of the Hadfield type. His chrome-vanadium and nickel-chrome steels gave greater wear with greater hardness than simple carbon steels of about 0.70 per cent carbon and 0.60 per cent manganese.

The tests which I have made confirm the conclusions of both Robin and Nusbaumer, and also those of actual service experience, that manganese, nickel, chromium, and vanadium have a marked effect on the wearing qualities of steels. Manganese apparently has a greater effect than either nickel or chromium. Vanadium, however, evidently has a much greater effect than either of these three elements, as it only requires a very small percentage to produce a marked increase in resistance to wear. This is apparent in steels E-1 and F-1; and C-1, and D-1, each of which pair is practically alike, except vanadium. These tests are only a small proportion of those planned, and it is the intention to cover not only a considerable range in composition and heat treatment, but also to study the effect of rollers of different composition and hardness, on the rate of wear of the various steels.

Table I.

Mark.	Wear, milligrams per 1,000,000 revolutions.	Treatment, degrees, Cent.	Carbon, per cent.	Manganese, per cent.	Silicon, per cent.	Chromium, per cent.	Nickel, per cent.	Vanadium, per cent.	Remarks.
P	3813.2	None	0.25	0.60	....	....	....	....	.....
P-1	2436.4	825/600	0.25	0.60	....	....	....	....	.....
O	1462.0	None	0.45	0.48	....	....	....	....	.....
O-1	1334.8	825/600	0.45	0.48	....	....	....	....	.....
8	1120.5	None	0.66	0.70	0.27	....	....	....	Tire
M-1	1104.1	825/600	0.28	0.61	0.28	....	3.10	....	.....
12	1079.6	825/600	0.75	0.68	0.25	....	....	....	Tire
E-1	1043.1	825/600	0.43	1.30	....	....	....	....	.....
U-1	958.0	825/650	0.58	0.65	0.20	1.26	....	0.20	Tire
C-1	829.8	829/600	0.38	0.30	....	1.16	2.08	....	.....
K-1	436.8	900/600	0.46	0.90	0.11	1.03	....	0.14	.....
F-1	371.9	825/600	0.48	1.15	....	....	....	0.22	.....
22	368.8	900/625	0.62	0.62	0.27	0.95	....	0.24	Tire
Y-1	367.8	900/600	0.28	0.50	0.12	0.96	....	0.22	.....
J-1	261.0	900/600	0.46	0.86	0.06	1.02	....	0.22	.....
D-1	230.1	825/600	0.42	0.22	....	1.27	2.14	0.26	.....

Note:—Under the heading "Treatment," 825/600 degrees Cent., indicates that the specimen was oil-quenched from 825 degrees and drawn back at 600 degrees Cent.

Alabama's Coke Industry

Alabama's output of coke in 1912 amounted to 2,975,489 short tons, valued at $8,098,412, against 2,761,521 short tons, valued at $7,593,594, in 1911, according to E. W. Parker, of the United States Geological Survey. The increase in 1912 was 213,968 tons, and $504,818 in value. Alabama retained in 1912 second place in the rank of coke-producing states, having superseded West Virginia in 1911. The average price per ton for Alabama coke has declined from $2.82 in 1910 to $2.75 in 1911 and $2.72 in 1912. This does not necessarily indicate an actual decline in the price of coke. A large proportion, possibly over 90 per cent, of Alabama's coke is consumed in furnaces which are owned by the same interests owning and operating the coal mines and coke ovens, and the placing of a value on the coke is largely a matter of accounting. The value per ton of the coke produced in 1912 was lower in spite of the fact that the value of the coal used advanced from $1.28 in 1911 to $1.35 in 1912.

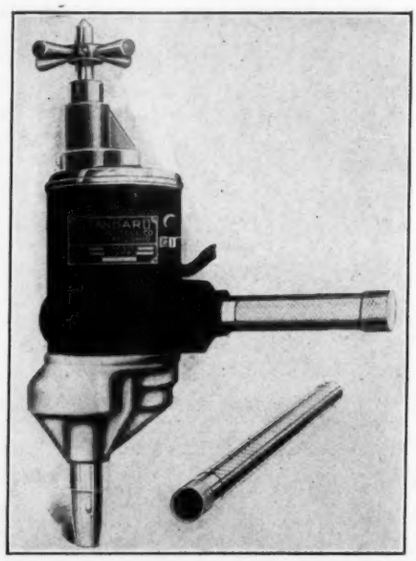
That Alabama has developed her coking industry along the lines of modern practice is evinced by the fact that in each of the last three years the only new ovens under construction on December 31 were retort ovens, none of the wasteful beehive type having been installed. Moreover, during 1912 there were 191 beehive ovens abandoned. The number of retort ovens, on the other hand, increased from 340 in 1911 to 620 in 1912, and there were 100 additional retort ovens under construction at the end of the year.

Table II.

Mark.	Wear, milligrams per 1,000,000 revolutions.	Hardness Brinnell.	Hardness Scleroscope.	Elastic limit, lbs. per sq. in.	Tensile strength, lbs. per sq. in.	Elongation, per cent, in 2 in.	Reduction of area per cent.	Treatment.
P	3813.2	134	23	47,000	68,000	33.0	57.3	None
P-1	2436.4	170	27	58,000	80,000	28.5	67.0	825/600
O	1462.0	156	26	43,000	79,000	28.5	47.5	None
O-1	1334.8	207	30	71,000	96,000	23.0	57.3	825/600
8	1120.5	196	34	63,000	121,000	14.0	19.0	None
M-1	1104.1	207	30	87,000	100,000	25.0	67.5	825/600
12	1079.6	228	38	97,560	144,930	15.0	23.0	825/600
E-1	1043.1	223	35	91,000	105,000	23.5	58.6	825/600
U-1	958.0	248	43	98,000	120,000	19.0	52.8	825/650
C-1	829.8	286	47	127,000	134,000	20.0	57.3	825/600
K-1	436.8	340	54	156,000	163,000	15.0	45.0	900/600
F-1	371.9	262	42	115,000	127,500	18.5	54.7	825/600
22	368.8	302	43	128,000	147,000	16.5	42.0	900/625
Y-1	367.8	293	50	137,000	148,000	16.5	46.0	900/600
J-1	261.0	340	54	162,000	167,500	14.5	49.0	900/600
D-1	230.1	340	52	156,000	161,150	16.0	53.3	825/600

Portable Electric Drill

Two new types of portable electric drills with a capacity of operating on steel 1¼ inches in thickness, have been developed by the Standard Electric Tool Co., Cincinnati. One of these drills is of the universal type and operates on both alternating and direct current and the other is for direct current operations only. The drills are equipped with ball bearings throughout and the motor is oil-proof. All of the gears are cut steel. One of these drills is shown in the accompanying illustration.



PORTABLE ELECTRIC DRILL BUILT BY THE STANDARD ELECTRIC TOOL CO.

The production of sulphur in the United States in 1912 was 303,472 long tons, valued at $5,256,422, compared with 265,644 long tons, valued at $4,787,049, in 1911. The sulphur came from Louisiana, Nevada, and Wyoming, the production of Louisiana being the dominant factor in the domestic sulphur industry.

Rod and wire mill in the Bergmann Electricitats Werke, Berlin

Germany's Great Industrial Plants Visited

Special Staff Correspondence

Cologne, Germany, July 1.—On Friday, June 27, following the reception given them in the Reichstag building, the delegates from the American Society of Mechanical Engineers were divided into a number of parties, for the purpose of inspecting various large machinery building plants in Berlin and its environs.

Among these, one of the most interesting is that of Ludwig Loewe & Co., which was modeled, in large part, after the works of the Brown & Sharpe Co., Providence, R. I., and includes many of the best features of German, American and English shop construction. Besides producing a large line of machine tools of its own design, this company acts as agent for leading English and American manufacturers. Its apprenticeship system is recognized as a model. This includes a continuation school with a 4-year course in mathematics, drafting, etc., with special instruction in foundry work.

Those of the visiting engineers who had a practical interest in power and electrical machinery were welcomed at the works of the Allgemeine Elektricitaets Gesellschaft, Siemens-Schuckert Werke and Bergmann Electricitaets Gesellschaft. The new steam

FIG. 1—ONE OF THE ASSEMBLING DEPARTMENTS IN THE BERGMANN ELECTRICITATS WERKE, BERLIN

FIG. 2—TURBINE TESTING DEPARTMENT, IN THE ALLGEMEINE COMPANY'S PLANT, BERLIN

FIG. 3—ROD AND WIRE MILL, IN THE ALLGEMEINE COMPANY'S PLANT, OBERSPREE, NEAR BERLIN

FIG. 4—LEAD COVERING DEPARTMENT OF THE OBERSPREE CABLE WORKS

FIG. 5—STATOR WINDING DEPARTMENT, ALLGEMEINE COMPANY'S PLANT, BERLIN

turbine and turbo-generator plant of the first named which, when completed, will be one building, 700 feet long, 133 feet wide, and 56½ feet to the crane runway, was the principal attraction. This is now in service for half its length. The equipment, which includes some of the best American tools, can hardly be surpassed in any country. At the Siemens-Schuckert Werke the visitors were equally impressed by the fine orderly arrangement of the machine shops and by the layout and attention to detail shown in the really magnificent factories for the manufacture of small electrical apparatus. The steam turbine power plant also proved to be a model of its kind, particularly in the arrangements for handling fuel and ashes. The Bergmann works showed equal progressiveness in their equipment and methods, with a greater degree of specialization. Among their products was one decidedly novel to the American visitors, namely, traction plows driven by electric motors. The company operates its own wire mill.

In the works of the A. Borsig Co., at Tegel, over 8,600 locomotives have been built. The plant contains a large variety of special machinery. For example, the visitors observed one large miller, with three heads, finishing a stack of boiler plates in one operation. The men are worked in three 8-hour shifts.

Side Trips

On Saturday, entertainment included an automobile trip to Potsdam, the summer residence of the Kaiser, a steamer trip on the Havel and a social time in the pleasure resort, Wannsee. Sunday, the delegates left for Dusseldorf and in the evening were received by city officials in the Rathhaus.

Monday, short trips were made to industrial works in surrounding communities, prominent among which are the blast furnace plant, steel furnaces and rolling mills of the Fried Krupp Akt. Ges. at Rheinhausen. Here a feature of interest to Americans was the unloading of ore from barges on the Rhine by means of eight electric cranes. These deliver the ore to stockpiles, whence it is transported by a suspended tramway, together with the coke and limestone, to the furnace hoists. The works include a Thomas converter plant, Martin-Siemens open-hearth plant, a rolling mill, gas and steam engine power plant, and 120 Koppers by-product coke ovens.

Of equal interest was the great steel plant at Oberhausen, known as the Guetehoffnungs Huette, which succeeded the small plant where Alfred Krupp learned his trade.

The mills of the Rheinische Stahlwerke, at Duisburg and its suburb, Meiderich, furnished an excellent example of German practice in the partial application of electric drive, which has not progressed quite so far abroad as in the United States and Canada. The blooming mill is equipped with a steam reversing engine, but normally is operated by two direct current motors on the Ilgner system. The billet mill and rail mill are engine-driven. Two of the merchant mills are operated by gas engines and two by electric motors. Nearly all other machinery, such as cranes, hoists, tables, pull-offs, live rolls, con-

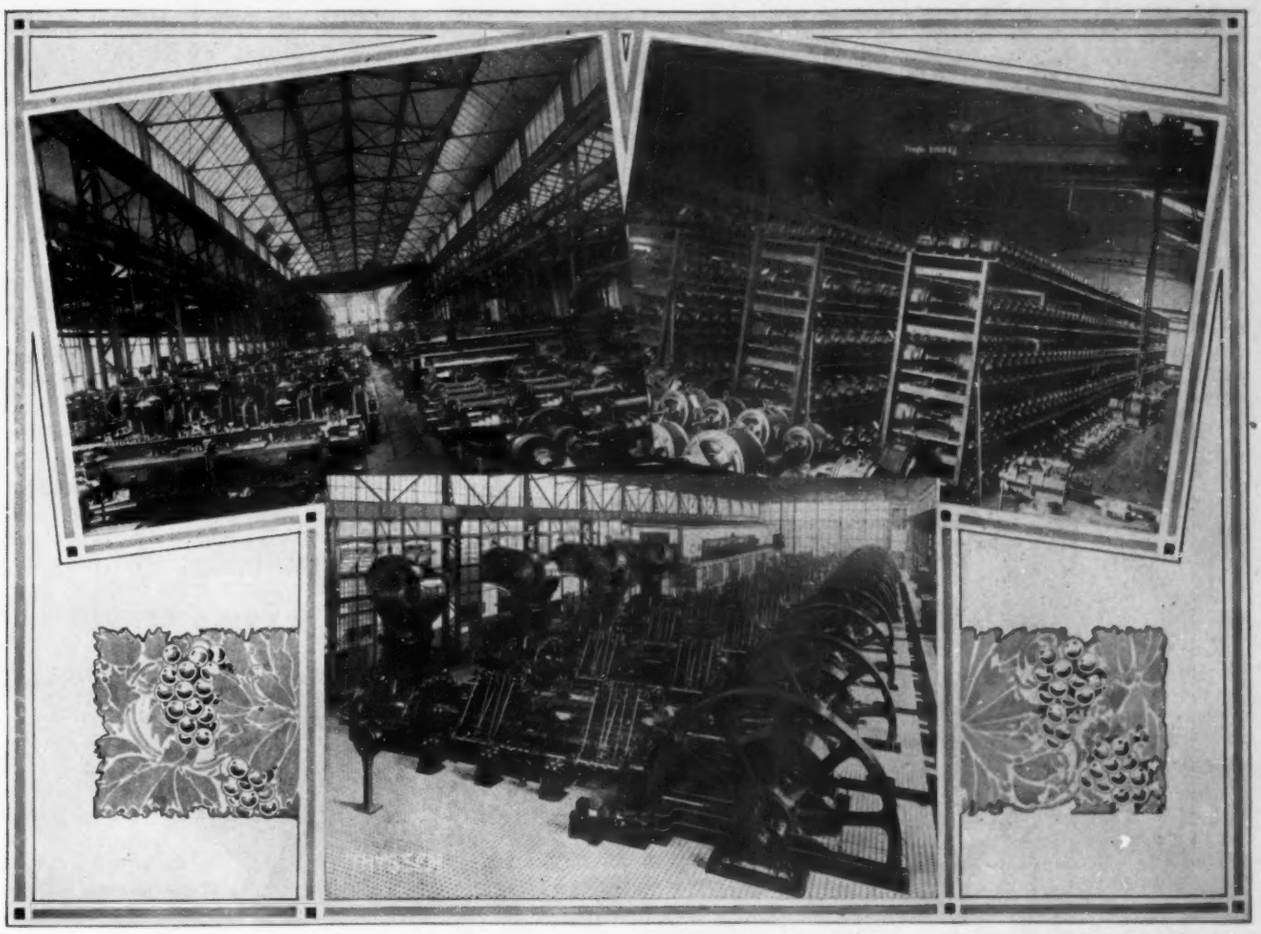


FIG. 6—ASSEMBLING DEPARTMENT, LUDWIG LOEWE & CO., BERLIN

FIG. 7—SMALL MOTOR WAREHOUSE, BERGMANN ELECTRICITATS WERKE, BERLIN

FIG. 8—THYSSEN GAS-DRIVEN BLOWING ENGINES IN MILL SERVICE

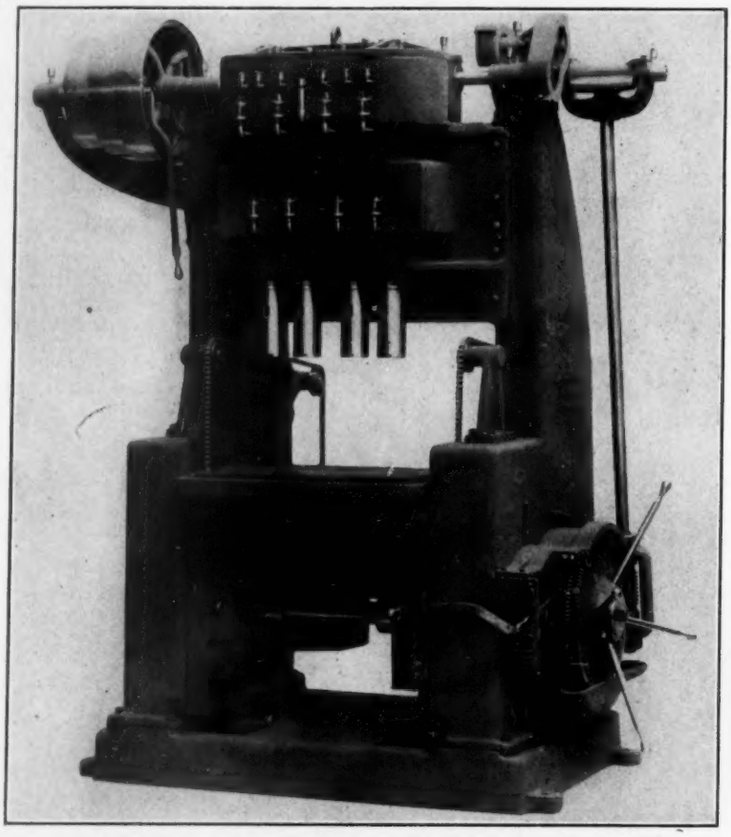
veyors, shears, saws, etc., is motor-driven. The plate mills, in a separate plant, are similarly arranged.

The great machine shops of Thyssen & Co., at Muelheim-Ruhr were found to be on a par with the best American plants. Here have been built a large number of the gas engines driving generators and blowing units for steel mills which are operated on blast furnace and coke oven gas; also rolling machinery, steam and electric hoists, turbines, pumps, etc. Next to the Krupps, the Thyssen interests are the largest in Germany. At Bruckhausen, they operate coke ovens, furnaces and mills, as well as coal mines, in the name of the Gewerkschaft Deutscher Kaiser.

Delegates also inspected another large establishment whose output is taken almost entirely by the iron and steel industries, namely, the Deutsche Maschinenfabrik, A. G., at Duisburg. Heavy cranes and handling machinery of all kinds were the specialties most in evidence.

Tuesday, July 1, was taken up with visits to some of the large machinery building plants in Dusseldorf, for which the city is becoming famous. At the works of Haniel & Lueg large gas engines were again seen under construction, together with mining machinery and other heavy equipment. Products of the Ernst Schiess Co. were found to include mammoth lathes, boring mills, etc., for working on heavy cannon, large steam turbines and other marine work. The equipment of the great Krupp shops at Essen was largely supplied from this plant. At the rod and wire mills, forge and machine shops of the Stahlwerk Becker, in Willich, the delegates were particularly interested in the testing department, which is very complete. Other plants visited were the Benrath works of the Deutsche Maschinenfabrick, A. G., and the steel works of the Rich. Lindeberg Co., at Remscheid. Some of the delegates also inspected the Elberfeld suspended railway, the Barmen mountain railway and the Mungsten Bridge.

Late in the afternoon the entire party left for Cologne, where the evening was spent at an informal gathering and pleasure trips.



FOUR-SPINDLE VERTICAL CYLINDER BORING MACHINE

Final advance figures compiled by V. C. Heikes, of the United States Geological Survey, show a notable increase in production of precious and semi-precious metals, especially of copper in Arizona in 1912. The total value of gold, silver, copper, lead, and zinc increased from $44,157,223 in 1911 to $67,050,784 in 1912.

Vertical Cylinder Boring Machine

A vertical cylinder boring machine, designed especially for boring and reaming cylinders and which can be used on cylinders cast singly, in pairs or *en bloc,* is now being built by the Foote-Burt Co., Cleveland. To obtain the greatest efficiency each machine is built especially for the particular cylinder on which it is intended to operate. The advantages claimed for vertical boring is that the chips drop away from the cut, thereby permitting a greater feed and speed to be maintained. The attachment for holding the cylinders consists of a box jig carrying removable jig plates. The latter guide and support the spindles by means of bushings in the jig plates. Bronze bushings on the spindles are slipped into the jig plate bushings after the boring tool has left the latter and further support the spindles while they are boring.

In designing the machine, great care was exercised to eliminate any tendency to chatter and to provide a steady and uniform drive and feed under all conditions. This has been accomplished by the use of a worm and worm gear drive with the final drive through double-pitch, nickel steel, spur gears. The spindles are high carbon steel forgings adjusted for wear by taper bearings with enclosed thrust collars. As shown in the accompanying illustration, it will be noted that the driving mechanism also is entirely enclosed and runs in oil.

The feed also is effected through a worm and worm gear with the final drive through spur gears. The pitch line of the feed pinions and racks is located directly under the center of the spindles. The power feed is provided with a knock-off and counterweights are attached to the table directly in line with the spindles. The table slides are so proportioned that the table does not feed out of the way, even at its highest point of travel. At the end of the cut the spindles are stopped by a brake and prevent scoring the cylinders when the table is returned. These boring machines are built in several different styles to meet various requirements. The one shown in the accompanying illustration is of the four-spindle, fixed-center type.

The value of the output of silver, copper, lead, and zinc in the states of Arkansas, Kansas, Michigan, Missouri, Oklahoma, Wisconsin and northern Illinois in 1912 was $79,675,814, an increase of $15,156,370 over the value for 1911 and of $23,349,111 over that for 1908. The total value of the production of these metals for the years 1908 to 1912, inclusive, was $327,385,944, of which $151,830,008 was for copper, $98,188,656 for zinc, $76,217,618 for lead, and $1,150,512 for silver.

The Heat-Treatment of Carbon Steel Castings[1]

Tests Which Show That to Obtain a Fine Microstructure in Annealed Stee Castings, Accelerated Cooling is Essential

By John H Hall

This paper is sul mitted with the object of showing briefly the behavior of cast steels with carbon contents of less than the eutectoid ratio of 0.90 per cent, under varying conditions of heat treatment. The following definitions will be adopted, in order to give known values to terms commonly used somewhat loosely in technical papers.

1.—*Slow Cooling.*—A slow cooling is such a rate of cooling that the steel shall cool from above Ac3 to black heat in not less than 50 minutes.

2.—*Accelerated Cooling.*—An accelerated cooling is such a rate of cooling that more than 20 minutes and less than 50 minutes are required to cool the steel from above Ac3 to black heat.

3.—*Rapid Cooling.*—A rapid cooling is such a rate of cooling that less than 20 minutes are required to cool the steel from above Ac3 to black heat.

4.—*Ingotism.*—Ingotism is the coarse crystalline structure of steel in the cast condition, and in hypo-eutectoid steels is indicated by the presence of primary ferrite resulting from the transformation of primary austenite *in situ*.

Two characteristic crystalline arrangements of the primary ferrite are found in hypo-eutectoid cast steels in the raw condition. The first is a network structure, in which the ferrite is arranged in a network around meshes of pearlite, which is interlaced with secondary ferrite. The second is the Widmanstattian structure, in which the ferrite is in needles in a triangular arrangement. In any one steel there will generally be found both of these structures, to a certain extent; but some steels show the triangular arrangement almost exclusively.

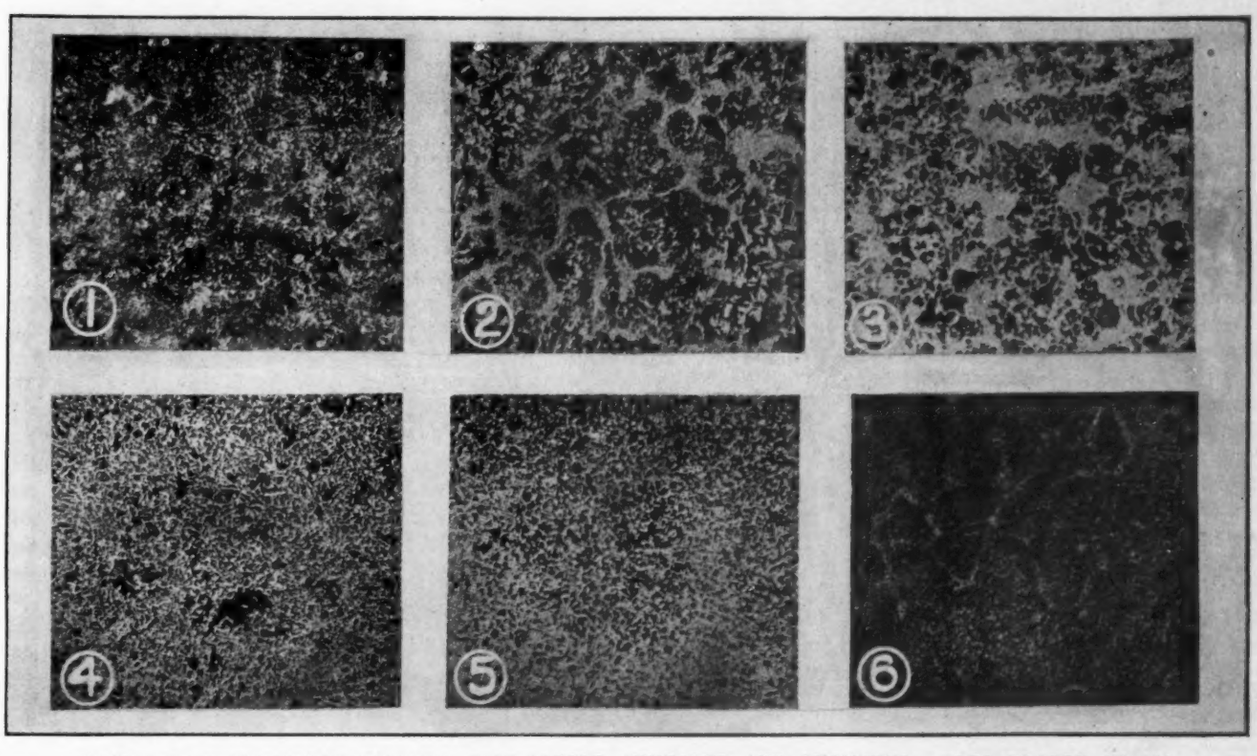
Re-precipitation of Ferrite

It is the experience of the author that in cast steel heated above Ac3 and cooled slowly, ferrite is re-precipitated more or less upon the lines originally occupied by it in the raw steel; and that if the network arrangement is found in the raw steel, traces of network will be seen in the refined steel; while if the rarer triangular arrangement of the primary ferrite is found in the raw steel, few traces of ingotism will occur in the refined steel. This may perhaps be owing to the fact that manganese sulphide segregates more markedly in steel possessing the network arrangement of the primary ferrite.

Though the fineness of the ingot structure of cast steel varies with the size of the casting, the center of a very large casting showing extremely coarse patches of ferrite, it is nevertheless the author's experience that the temperature necessary to efface this ingotism is practically independent of the coarseness of the structure, and that at a given temperature, for instance 850 degrees Cent., the time necessary for the refining to take place, counted from the moment when the steel has reached that temperature throughout its mass, is the same for both large and small castings. Though 850 degrees is high enough to refine the ingot structure of hypo-eutectoid cast steel, yet 900 degrees will refine it more rapidly and hence was adopted as the standard refining temperature for the work which is to be described.

Fig. 1 shows the microstructure of a

[1]Presented at the Atlantic City meeting of the American Society for Testing Materials.



FIGS. 1 TO 6—MICROSTRUCTURE OF CAST STEELS, ANNEALED AND QUENCHED, ALSO COOLED IN AIR

cast steel annealed for two hours at 900 degrees Cent., cooled slowly to 800 degrees, and quenched in water; Fig. 2 shows a similar steel heated to the same temperature for the same length of time, cooled slowly to 750 degrees, and quenched in water. Fig. 1 shows very fine sorbite (or martensite), while Fig. 2 has the typical structure of steel heated above Ac3 and cooled slowly. The strongly marked patches of ferrite occupying the outlines of the primary ferrite network are strikingly shown in Fig. 2.

Fig. 3 shows a similar steel heated to 900 degrees Cent., for three hours and cooled slowly; in this case the cooling from 900 to 600 degrees occupied six hours. A general family resemblance is seen between Figs. 2 and 3, with coarser structure, owing to the slower cooling.

Fig. 6 shows a similar steel heated to 900 degrees Cent. for 2½ hours, cooled slowly to 800 degrees and quenched, then reheated to 700 degrees and quenched. Comparing Figs. 1 and 6, we see that in Fig. 6 the ground mass is an extremely fine mixture of ferrite and pearlite (or sorbite); but masses of primary ferrite have been formed, showing the characteristic arrangement of primary ferrite in the network form.

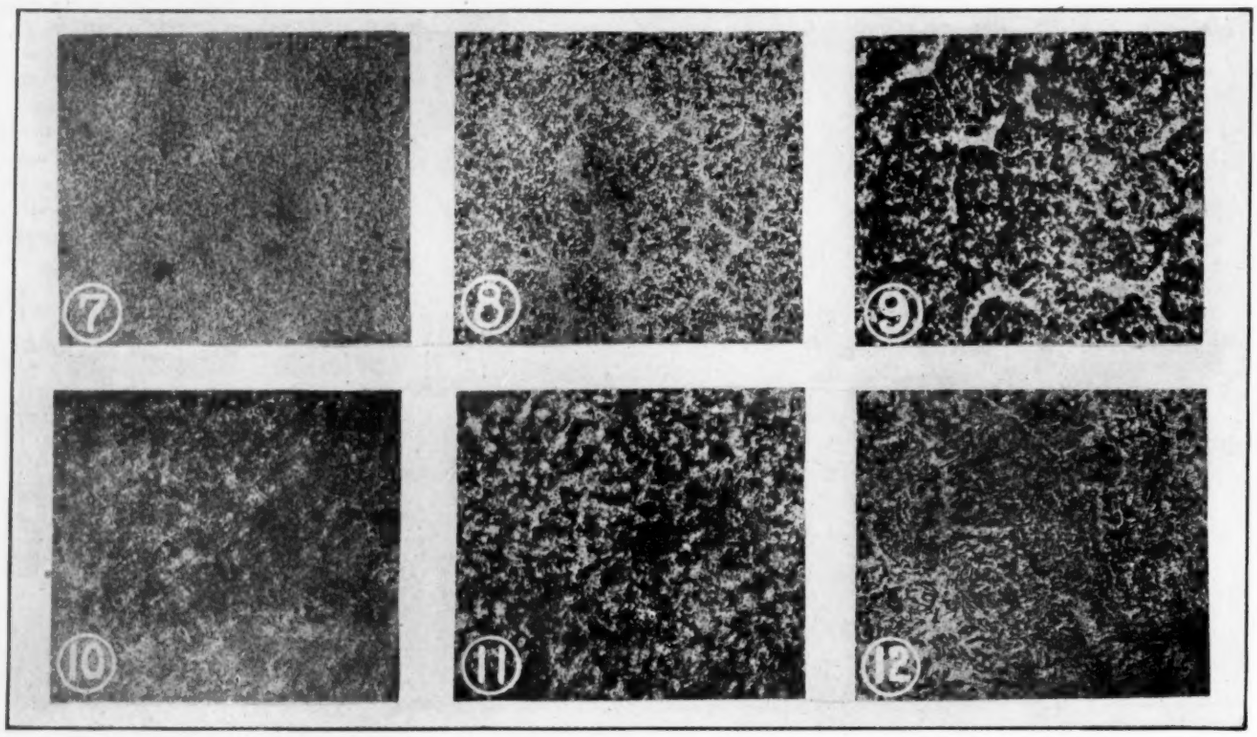
Fig. 7 shows a similar steel heated to 900 degrees Cent. for 2½ hours and cooled in air, then reheated to 700 degrees for one hour and cooled slowly. Comparing Fig. 7 with Fig. 4, we see that their structures are almost exactly alike, except that in Fig. 7 the ferrite is slightly coarser.

In Fig. 8 is shown a similar steel heated to 900 degrees Cent. for two hours and air-cooled, then reheated to 750 degrees for one hour and cooled slowly. Comparing this with Fig. 7 and Fig. 4, it will be seen that the ground mass of Fig. 8 resembles Fig. 7 closely, the ferrite being naturally a little coarser; but in addition, there are the same patches of ferrite in the network arrangement of the original network structure that obtain in Fig. 6.

It is clear from these examples that the cast steel has a strong tendency to re-precipitation of ferrite in heavy masses along the lines of the original ingot structure; that this tendency can be repressed by accelerated or rapid cooling; and that if so repressed, upon again heating above Ar1 the ferrite tends strongly to the same coarse recrystallization. In this connection, the author wishes to state that the illustrations show only a few of several hundred samples of steel treated in the course of this research, all of which showed the same tendency to crystallization of coarse ferrite under the same conditions; some less strongly than those shown, some more so.

One somewhat unexpected result shown in these illustrations is that in reheating a quenched steel, coarse ferrite appears upon a very short heating at 700 degrees Cent., while in reheating an air-cooled steel, even after one hour at 700 degrees, no such re-precipitation of ferrite occurs. This appeared so inherently improbable that the greatest pains were taken to prove the fact, two bars of the same steel being heated side by side in the same furnace to 900 degrees, one quenched and one cooled in air, then reheated side by side in the same furnace to 700 degrees, and cooled slowly together. This experiment was twice repeated on two different steels, and twice confirmed the fact.

In order to show that steels quite low in sulphur exhibit the same characteristic behavior in annealing, Fig. 9 (an electric furnace steel) is added to this collection. This steel was heated to 900 degrees Cent. for four hours and cooled



FIGS. 7 TO 12—MICROSTRUCTURE OF ANNEALED AND COOLED CAST STEEL SPECIMENS

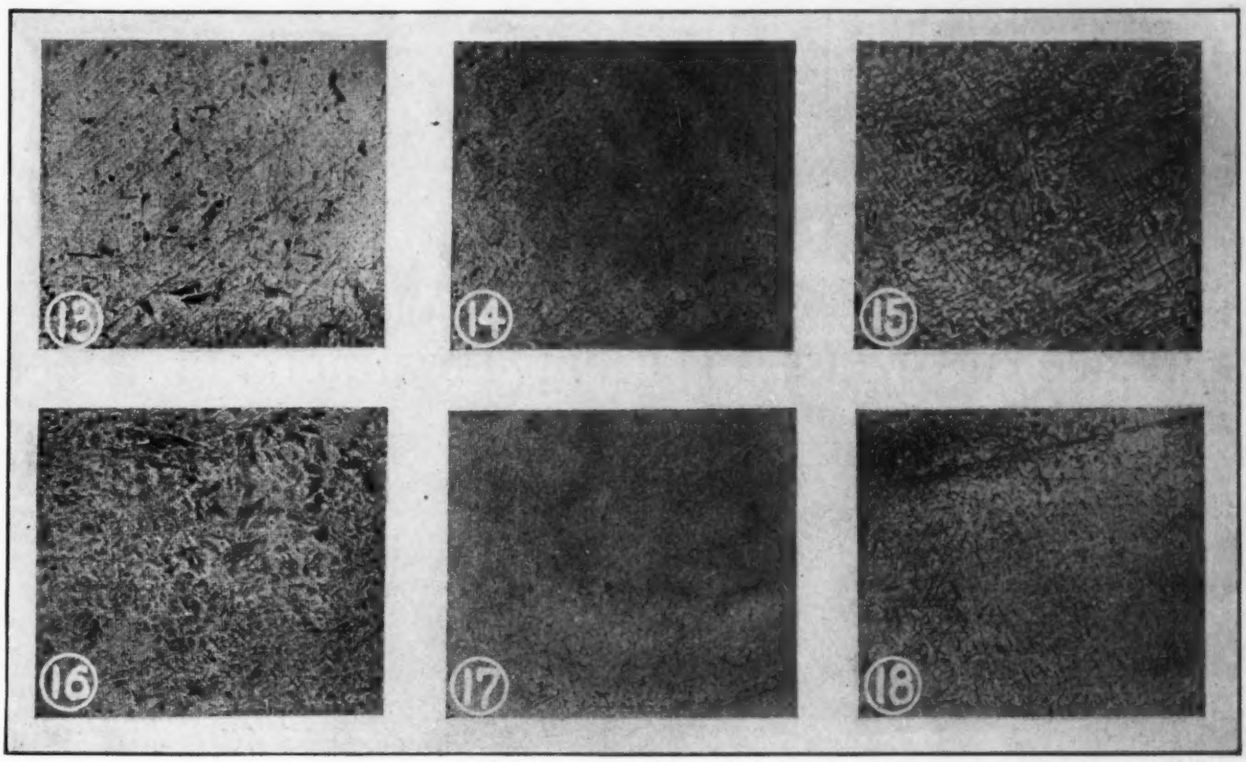
the difference that in Fig. 3 the coarse ferrite occurs in wide masses; and rather more ferrite in finer particles occurs. The steel of Fig. 2, quenched from above Ar1, does not, of course, show as complete a separation of ferrite as Fig. 3.

Fig. 4 shows a similar steel, heated to 900 degrees Cent. for three hours, and cooled in air in about 10 minutes. The fine network structure is characteristic.

In Fig. 5 is shown the structure of a similar steel heated to 900 degrees for one hour, and cooled to black in 40 minutes, or at an accelerated rate. There is a close resemblance between Figs. 4 and 5, but Fig. 5 shows a somewhat

in air, then reheated to 760 degrees for two hours and slowly cooled. Comparison of Figs. 9 and 8 shows that this steel, comparatively low in sulphur, exhibits the same traces of primary austenite after this treatment.

Clearly, then, in order to produce a truly fine microstructure in cast steels, it is necessary to restrain or suppress the tendency to coarse crystallization of the ferrite by accelerated or rapid cooling, since slow cooling as defined in this paper results in coarse structure. The effect of rapid cooling being to harden the steel very considerably and at the same time produce harmful stresses in castings of uneven section, a second heating to soften the steel and relieve the stresses is necessary; but this heating must not exceed 680 degrees Cent.



FIGS. 13 TO 18—MICROSTRUCTURES OF LOW CARBON STEEL SPECIMENS, QUENCHED AND REHEATED

for quenched steel and 720 degrees for air-cooled steel, or a crystallization of ferrite in coarse masses will take place.

Fig. 10 shows a soft steel heated to 900 degrees Cent. for 5 hours and quenched, then reheated to from 650 to 680 degrees for 6½ hours and cooled in air. The physical properties of this steel are as follows:

Tensile properties.	
Tensile strength, lb. per sq. in.	91,900
Elastic limit, lb. per sq. in....	71,650
Elongation in 2 in., per cent..	20.37
Reduction of area, per cent...	50.25
Fracture	Silky
Bend properties.	
Specimen 1 by ½ in. bent 180 deg. around a 1-in. mandrel.	
Fremont test	21.0 kgm.

In order to show the influence of microstructure upon the physical properties of the steel, Figs. 11 and 12 are included. These are the microstructures of two small castings of about the same carbon content as the steel shown in Fig. 10, which have been annealed by heating and slow cooling, and exhibit the characteristic coarse crystallization of cast steel so treated. The casting whose microstructure is shown in Fig. 12 was cut in two, one-half set aside for test, and one-half treated as follows: Heated to 900 degrees Cent. for 4 hours and quenched in water, reheated to 680 degrees for 8 hours and cooled in air. The two halves were then tested under a drop of about 500 pounds falling weight, with the result that the annealed half (Fig. 12) broke into three pieces with one blow of the drop from a height of 4 feet; while the heat-treated half was unbroken after one blow from 4 feet, one blow from 5 feet, one from 6 feet, one from 7 feet and two from 8 feet, six blows in all.

That steel low in carbon is considerably improved, especially in resistance to shock, by quenching and reheating, is shown by the following tests upon steel of 0.10 per cent carbon, low in silicon and manganese. This steel is shown in the cast condition in Fig. 13; in Fig. 14, after heating to 900 degrees Cent., for 3 hours and cooling to black in 40 minutes; in Fig. 15, after heating to 900 degrees for three hours and cooling slowly; in Fig. 16, after heating to 900 degrees for three hours and quenching in water; in Fig. 17, after heating to 900 degrees for three hours and cooling in air, then reheating to 710 degrees for six hours and cooling in air; and in Fig. 18, after heating to 900 degrees for three hours and quenching in water, then reheating to 680 degrees for eight hours and cooling in air. These coupons were all cast on one casting. The physical properties of these bars, as far as they could be obtained, are given in Table I.

By means of test bars which were used for rough measurements of stress by measuring the distance between punch marks in the lighter section before and after sawing through this part with a hack saw, determinations of stresses in the cast steel after various treatments were made. It was found that the raw steel, or the steel heated to 900 degrees Cent. and cooled in air, water or oil, was in a state of serious stress; that the slowly cooled steel was quite free from stresses, and that the stress in the steel cooled in 40 minutes from 900 degrees, or cooled in air from 680 and 700 degrees, was too slight to be measured.

All microphotographs are at a magnification of 60 diameters. All samples were heated in an electric resistance muffle furnace, the temperatures being measured with a LeChatelier pyrometer. The steels, with the exception of the electric-furnace steel, and the two castings, Figs. 11 and 12 (whose origin is unknown) are all baby-Bessemer steels.

Table I.

RESULTS OF TESTS OF 0.10 PER CENT CARBON STEEL.

Fig. No.	Treatment.	Tensile strength, lb. per sq. in.	Elastic limit, lb. per sq. in.	Elongation, in 2 in. per cent.	Reduction of area, per cent.	Fracture.	Degrees bend of 1 by ½-in. specimen around 1-in. mandrel.
14	None	50,020	23,930	35.2	47.85	coarse Crystalline	50
15	900 degrees for 3 hours, cooled in 40 minutes..	55,390	28,750	38.5	67.0	silky cup	180
16	900 degrees for 3 hours, cooled slowly	.....	.....	....	....	.....	45 (blow hole)
17	900 degrees for 3 hours, quenched	.....	.....	....	....	.....	180
18	900 degrees for 3 hours, air-cooled; 710 degrees for 6 hours, air-cooled.	56,450	32,950	39.25	65.2	silky cup	180
19	900 degrees for 3 hours, quenched; 680 degrees for 8 hours, air-cooled	53,200	27,100	34.95	60.4	silky cup	180

Complete analyses of the samples are unfortunately not available, but it can be stated that the phosphorus and sulphur of all of them lie between about 0.04 and 0.07 per cent, averaging a little over 0.05 per cent. The analyses, so far as available, are given in Table II.

Book Review

The 1913 Lake Superior Iron Ore Annual; 72, 6 x 9-inch pages, illustrated; published by the Penton Publishing Co., Cleveland; price, bound in cloth, $1; leather, $2, postpaid.

Official statistics of the movement of iron ore from the Lake Superior district, have been compiled in book form by THE IRON TRADE REVIEW. Statistics, which are the official figures on iron ore shipments, have been kept by THE IRON TRADE REVIEW for 23 years, but are now assembled in a form for easy reference, for the first time. The statistics cover the individual records of mines on all of the iron ranges, the dock shipments and receipts at upper and lower lake ports, respectively, analyses of the ores from the different ranges, etc.,

Table II.

ANALYSES OF STEELS.

Fig. No.	Carbon, per cent.	Silicon, per cent.	Manganese, per cent.	Sulphur, per cent.	Phosphorus, per cent.
1	0.42	0.51	0.60	.....	.....
2	0.39	0.48	0.47	.....	.....
3	0.41	0.45	0.51	.....	.....
4	0.43	0.49	0.60	.....	.....
5	0.41	0.52	0.68	.....	.....
6	0.39	0.41	0.55	.....	.....
7	0.35	0.42	0.65	.....	.....
8	0.35	0.42	0.65	.....	.....
9	0.59	0.14	0.72	0.023	0.017
10	0.21	....	1.17	.....	.....
11	0.18	0.41	0.93	0.065	0.052
12	0.20	0.45	1.02	0.057	0.049
14 to 19	0.10	0.19	0.23	.....	.....

Influence of Mass in Heat-Treatment of Steel[1]

By K W Zimmerschield

It is a matter of common knowledge that mass exercises considerable influence upon the properties of a piece of steel undergoing heat treatment, but concrete published data on this subject are meager.

During the course of an investigation for other purposes, the opportunity of conducting a few experiments on this point offered itself, and the results are reported herein, since they exhibit interesting and instructive phenomena. The scope of the work is narrowly defined, but the results are so promising that a considerably fuller program of experiments has been outlined for future development of the subject; the results of these experiments we hope will be valuable enough to report in full.

The material employed was of the Mayari type, with low nickel and chromium content; the analysis was as follows:

	Per cent.
Carbon	0.37
Manganese	0.60
Phosphorus	0.010
Sulphur	0.030
Nickel	1.21
Chromium	0.58
Copper	0.10

[1]Presented at the annual meeting of the American Society for Testing Materials, held at Atlantic City, June 24-28.

Test bars were machined from the original 1½-inch rounds, as shown in the accompanying illustration. To take care of warpage and surface decarbonization during heat treatment, 0.040 inch was left on the diameter of the sections, *X* and *Z*, to be ground off before pulling in the tensile machine. In order to have the heat treatment on sections *X* and *Y* the same, the latter was also turned to 1.169 inch in diameter; so that the physical properties of the steel throughout section *X*, as a whole, and of that in the core, *Y*, may be compared. Two such composite bars, marked *M32* and *T32*, were subjected to heat treatment No. 2, and two others, marked *T33* and *T33a*, to heat treatment No. 3, as shown in Table 1.

After heat treating, each bar was then cut into sections *X*, *Y*, and *Z*, as shown in the accompanying illustration. Each of these portions was then machined into a finished test piece of the diameter indicated in Table 1, and pulled. Sections *Y* and *Z* were machined to the standard test piece of the Society of Automobile Engineers.

Detailed results of the tension tests of each section are given in Table 1; a summary of the percentage relations of the averages, calculated both upon the basis of the lowest and of the highest figures obtained, are given in Table II. A consideration of these tabulations reveals some interesting data:

1.—The results of duplicate tests are quite concordant except in the following cases: Tensile strengths on *Y3* and *Z3*; elastic limits on *Z2* and *Z3*; reductions of area on *Y2*, *Z2*, *X3*, *Y3* and *Z3*; elongations on *Y2* and *Y3*. All the averages, however, are consistent.

2.—The lower annealing temperature used in treatment No. 3 gives, as expected, consistently higher tensile strengths and elastic limits, together with lower reductions of area and elongations.

3.—Given the same treatment, the smaller sections, *Z*, have considerably higher tensile strengths and elastic limits, while the reductions of area are not lower, as might be expected, but were even slightly higher. This we would explain by the relatively long period of annealing; 45 minutes have sufficed to toughen the thinner sections in a considerably greater degree than they have the thicker ones.

The elongations of sections *X*, *Y*, and

Z are not strictly comparable, because the ratio between length and diameter was almost eight in the first series and four in the other two. This discrepancy will be corrected in future work.

4.—The core of a 1⅛-inch iron bar (section *Y*) after this treatment, has distinctly better physical properties throughout than those of the whole section. This condition is quite contrary to our expectation—the inside of a bar is generally supposed to have lower physical properties than the bar as a whole or than the outside.

Explanation of Results

The following explanation of the results obtained is offered:

During quenching, the exterior of a bar is cooled more rapidly than the interior, and hence, if untempered subsequently, the exterior portion would show higher tensile strengths and elastic limits with lower reductions of area and elongations than the center. On annealing, likewise, the exterior is again affected first and of course will be tempered more than the interior. By a proper adjustment of the time and temperature of this latter operation, then, we probably could manage to "draw back" merely the excess strength and brittleness of the outside of the bar and to balance its properties against those of the core. The above results show that the heating for 45 minutes has carried the tempering effect past this balance point, and the exterior of the bar has been "drawn" to properties appreciably below those of the core.

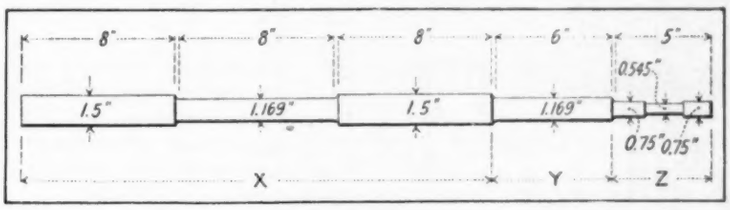
5.—Higher tensile strengths and elastic limits do not necessarily indicate the co-existence of lower reductions of area and elongations. In comparing the bars of section *X* with those of section *Y*, we find under both heat treatments that distinctly the reverse can happen. In the present case we would ascribe the cause to the difference in the quenching action of the oil upon the outside and upon the inside of the bar, respectively; the slower cooling to which the core has been subjected, due to its protection by the outside layers of metal, has left it in a considerably tougher state. If objections to comparing reductions on such different diameters of test bars are raised, we would refer to sections *Y* and *Z*. Here the tensile strengths and elastic limits have been increased about 25 per cent, respectively, while the reductions have been reduced only about 2 to 6 per cent.

Table I.

RESULTS OF TENSION TESTS

Heat treatment.	Mark.	Test piece. Diameter treated, in.	Test piece. Diameter pulled, in.	Tensile strength, lb. per sq. in.	Elastic limit, lb. per sq. in.	Reduction of area, per cent.	Elongation, per cent.
	M3X2	1.169	1.1285	109,860	80,000	57.9	11.0[1]
	T3X2	.....	.....	110,800	82,000	54.7	12.0[1]
Treatment No. 2.							
1. Heated 30 min. at		Average	.....	110 330	81,000	56.3	11.5[1]
1,550 deg. to 1,575	M3Y2	1.169	0.505	112,500	85,000	61.0	20.5
deg. Fahr.	T3Y2	.....	.....	117,000	85,000	56.0	17.5
2. Quenched in oil.							
3. Reheated 45 min. at		Average	.....	114,750	85,000	58.5	19.0
1,000 deg. Fahr.	M3Z2	0.545	0.505	140,900	117,500	60.5	17.0
	T3Z2	.....	.....	143,600	125,000	53.5	15.0
		Average	.....	142,250	121,250	57.0	16.0
	T3X3	1.169	1.1285	119,000	84,000	46.1	10.1[1]
	T3X3a	.....	.....	118,400	89,000	56.1	11.5[1]
Treatment No. 3.							
1. Heated 30 min. at		Average	.....	118,700	86,500	51.1	10.8[1]
1,550 deg. to 1,575	T3Y3	1.169	0.505	116,700	90,000	60.0	20.5
deg. Fahr.	T3Y3a	.....	.....	123,600	91,700	48.4	15.5
2. Quenched in oil.							
3. Reheated 45 min. at		Average	.....	120.150	90,850	54.2	18.0
900 deg. Fahr.	T3Z3	0.545	0.505	145,300	125,000	56.5	14.0
	T3Z3a	.....	.....	160,000	140,000	47.0	12.5
		Average	.....	152,650	132,500	51.7	13.2

[1]Elongation measured in 8-inch gage length; all others in 2-inch gage length.



THE BARS TESTED

The great production of petroleum in 1911, which was 220,449,391 barrels, was equaled and passed in 1912, when the total reached 222,538,604 barrels. Higher prices were the rule in 1912 except in California, and even in that state there was no material decline. The total value, therefore, increased markedly, reaching $164,087,342, or 22.41 per cent above the value for 1911.

Importance of By-Product Coke in Indiana

The production of coke in Indiana in 1912 amounted to 2,616,339 short tons, valued at $12,528,685. The yield of coal in coke was the highest attained in the United States, 81.8 per cent, according to E. W. Parker, of the United States Geological Survey.

With the completion and putting in operation of the 560 Koppers ovens by the United States Steel Corporation at Gary, Indiana in 1912 advanced to third place among the coke-producing states, displacing West Virginia, Illinois, and Colorado. Indiana's production in 1912 exceeded that of West Virginia by about 150,000 tons, and was only about 360,000 tons less than that of Alabama. It is probable that within two years, if not in 1913, Indiana will supplant Alabama as the second coke state, as at the close of 1912 there were 169 retort ovens in course of construction. In addition to the ovens at Gary there were 50 United Otto ovens operated by the Citizens Gas Co., at Indianapolis.

Table II.

SUMMARY OF PERCENTAGE RELATIONS

Heat treatment.	Test piece. Diameter treated, in.	Test piece. Diameter tested, in.	Tensile strength. Percentage of lowest.	Tensile strength. Percentage of highest.	Elastic limit. Percentage of lowest.	Elastic limit. Percentage of highest.	Reduction of area. Percentage of lowest.	Reduction of area. Percentage of highest.	Elongation. Percentage of lowest.	Elongation. Percentage of highest.
	1.169	1.1285	100	77	100	67	100	96	...[1]	...[1]
No. 2	1.169	0.505	104	81	105	70	104	100	109	100
	0.545	0.505	129	100	150	100	102	97	100	85
	1.169	1.1285	100	78	100	65	100	94	...[1]	...[1]
No. 3	1.169	0.505	101	79	105	67	107	100	136	100
	0.545	0.505	129	100	153	100	101	95	100	73

[1]Elongation measured in 8-inch length; all others in 2-inch gage length.

Notes on the Property of Toughness in Metals[1]

How Tension and Bend Tests Are Made on a New Automatic and Autographic Machine of High Precision

By Albert F Shore

A metal to be tough must have a high elastic strength and considerable ductility. A brittle metal of great strength is not tough, nor is a ductile metal of low strength. It is difficult sometimes to tell just when toughness begins; for example, the plasticity of such a metal as lead is a different property from the ductility of gold.

The property of toughness in metals does not appear to have been directly measured up to the present time. In that connection it is desirable that a scale for the measurement of toughness should be provided, such as we have for indicating temperature, pressure, or hardness.

There are three methods of determining the factors of strength and ductility constituting toughness.

1.—By making a tension test, which gives the elastic limit in pounds per square inch and the percentage of elongation in any desired length.

2.—By making a cold bend test, from which may be determined the elastic limit in pounds per square inch and the number of degrees of permanent bend.

3.—By making two tests: The hardness test, which gives the hardness numeral, and the cold bend test, which gives the number of degrees of permanent bend.

In each of these three methods two properties are determined, which when expressed as one versus the other (for example, by the first method, 45,000 pounds per square inch vs. 25 per cent) convey a definite idea and an accurate estimate of the toughness of the metal.

The first method is probably the one most preferred because it is in most general use at the present time, and is therefore best understood. From the standpoint of economy it has the disadvantage that a rather complex test specimen must often be made; while if an unprepared specimen is used, a comparatively large size is required on account of the wedge grip used.

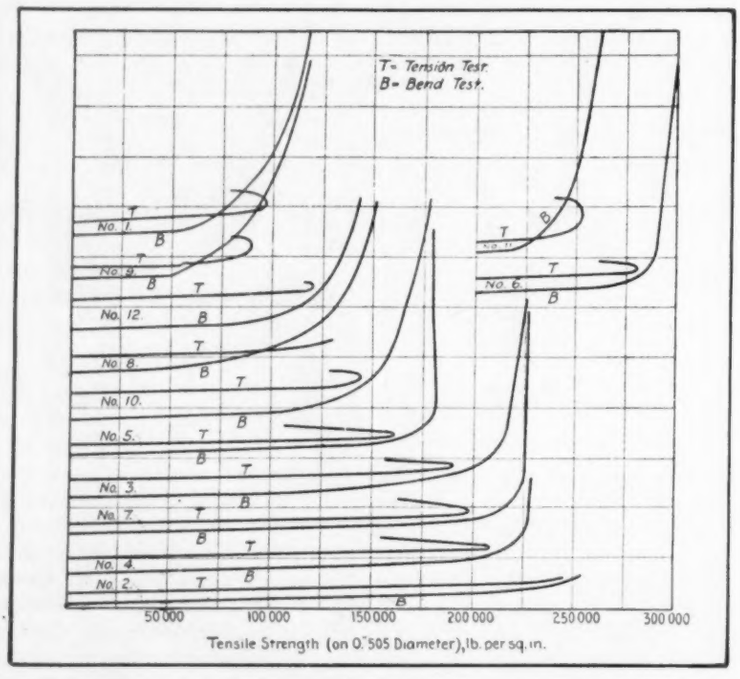


FIG. 1—CURVES SHOWING RELATION BETWEEN TENSION AND BEND TESTS

Scientifically, the elongation obtained on a tension test specimen is indefinite. In annealed brass and copper the whole piece will elongate, while in the case of the harder metals most of the elongation is confined to the spot where the break occurs; therefore, in speaking of elastic limit versus percentage of elongation, a somewhat vague idea of the toughness is given. The bend test specimen does not have to be especially prepared. The elastic limit, untimate strength and the number of degrees of permanent bend can be clearly defined on the autographic chart, taken from a bend test. Further, the elongation on the tension side of the neutral axis is confined to a definite and known place, so that in speaking of degrees of permanent bend, we have a more accurate estimate of ductility than can be obtained from the elongation of the tension test specimen.

A Simple Test Method

The third method is necessarily so approximate that it is not satisfactory for regular use in the laboratory; but as a "sub" or "deputy" test, it is so simple that it is by far the most generally used for inspection purposes in one modified form or other. This can be illustrated by the following example in actual practice: A number of gears are made and heat-treated in the same way as the master test specimen, the strength, hardness and ductility of which have been determined in the usual manner. Since in this case the heat-treatment is for hardening, it will be necessary to test the gears for hardness only, to see that the hardness value agrees with that of the master specimen. This in turn assures the same toughness value in the gears as in the specimen.

Relation of Bend and Tension Test Readings

In many instances a hardness test on soft steel, in connection with the ductility factor, has solved the problem of individual piece inspection; and the method is being adopted by the railroads for testing car axles, etc.

It is also possible to test in this way the toughness of very large forgings or castings in a number of places, by sawing off a sliver, bending it in a vise, and then measuring its hardness.

The desirability of being able to resolve the readings of the tension test into those of the bend test, or *vice versa*, is evident.

It is a well-known fact that a metal which shows a high tensile strength will show high values on almost any kind of strength test applied to the same piece, whether it be the bend, torsion, compression, shear or hardness test.

According to experiments made by the

[1]Presented at the Atlantic City meeting of the American Society for Testing Materials.

writer, there is a definite relation between the results of the tension and bend tests. This is shown graphically in Fig. 1, on which are plotted stress-strain curves for tension, marked *T*, and autographic curves for the bend tests, marked *B*. The scale figures at the bottom of the diagram apply directly to the curves for tension only.

Heat Treatment of Steels

The following list describes the steels and the heat-treatment to which they were subjected; the numbers correspond to those on the curves in Fig. 1:

No. 1.—Nickel steel, annealed.

No. 2.—Vanadium tool steel, hardened at 1,500 degrees Fahr. in water, drawn 800 degrees Fahr.

No. 3.—Chrome-nickel steel, hardened at 1,500 degrees Fahr. in oil, left so.

No. 4.—Nickel steel, hardened at 1,500 degrees Fahr. in water, drawn 750 degrees Fahr.

No. 5.—Chrome-nickel steel, hardened at 1,500 degrees Fahr. in water, drawn to 800 degrees Fahr.

No. 6.—Machine steel, cold-rolled.

No. 7.—Nickel steel, hardened in oil at 1,500 degrees Fahr. and left so.

No. 8.—Vanadium tool steel, hardened at 1,500 degrees Fahr. in air blast, left so.

No. 9.—Vanadium tool steel, annealed.

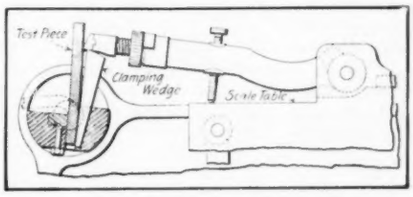


FIG. 2—DIAGRAM SHOWING HOW THE CANTILEVER BEND TESTS ARE MADE

No. 10.—Chrome-nickel steel, annealed.

No. 11.—Machine steel, hot-rolled.

No. 12.—High-speed steel, annealed.

Both the tension and bend tests were made on a new automatic and autographic machine of high precision. The method of making the bend test is illustrated diagrammatically in Fig. 2. The ratio of supported length to thickness of specimen was 6 to 1.

Since the power of the scale can be adjusted to any desired degree by use of a pendulum balance, and since the load on the free end of the bend test specimen is only a fraction, namely 5 per cent, of what would be required to rupture a tension specimen of the same area, the scale of each bend test curve has been enlarged 20 times.

By this method the average relation between the ultimate strengths as indicated by tension and bend tests, the latter being made as above described, is constant within 5 per cent plus or minus. The elastic limits show wider variation, averaging 10 per cent plus or minus.

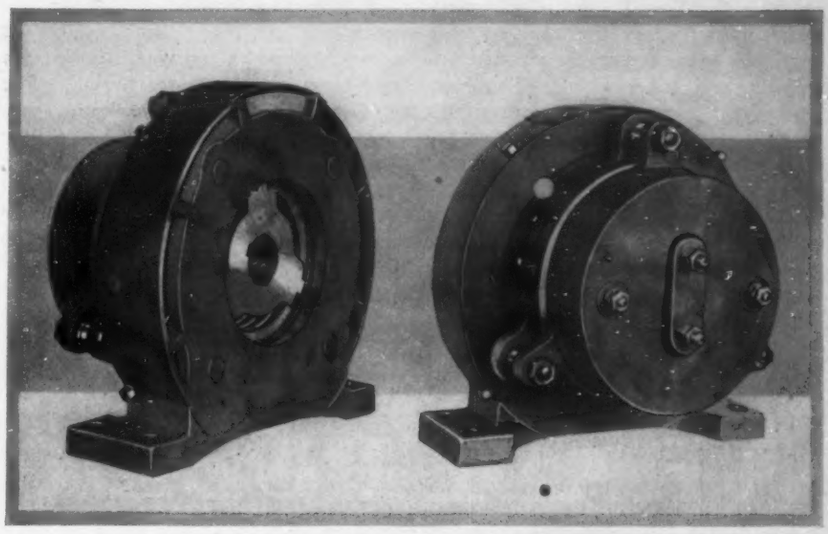


FIG. 1.—CORED VENTILATING PASSAGES IN MAGNETIC BRAKE

FIG. 2.—ASSEMBLED VIEW OF MAGNETIC DISC BRAKE

A New Multiple Disc Brake

Accessibility of parts is a prominent feature of a new magnetic brake now being manufactured by the Cutler Hammer Clutch Co., Milwaukee. In the older designs there is no way of removing and replacing the discs without practically dismantling the brake and taking it off the motor shaft, because the discs are so arranged that the magnet winding must be first removed, the brake slid free of the shaft and the disc top plate taken off before the discs themselves become accessible. With the new brake, an assembled view of which is shown in Figs. 1 and 2, the mere loosening of the three bolts, Fig. 2, which secure the magnet coil in place, gives access to the discs which can then be slid out of the case along the shaft.

Positive ventilation is another feature claimed for the new brake. The rotating discs shown in the exploded view, Fig. 3, have cored radial passages similar to those in the runner of a centrifugal pump. When set in motion air is drawn in through inlet passages in the hub and ejected through outlets provided in the side of the enclosing frame, under the cover. The ventilation secures better capacity and wearing qualities and it is claimed that no lubrication is required.

The brake consists of a hub, a series of stationary and rotating discs, an enclosing case, a spiral spring and an electro-magnet. The hub, which is mounted on the motor shaft, carries the rotating discs. The latter are interleaved between the stationary discs which are anchored to the enclosing case. The stationary discs are faced with a lining having a high co-efficient of friction and the rotating discs have internal radial air

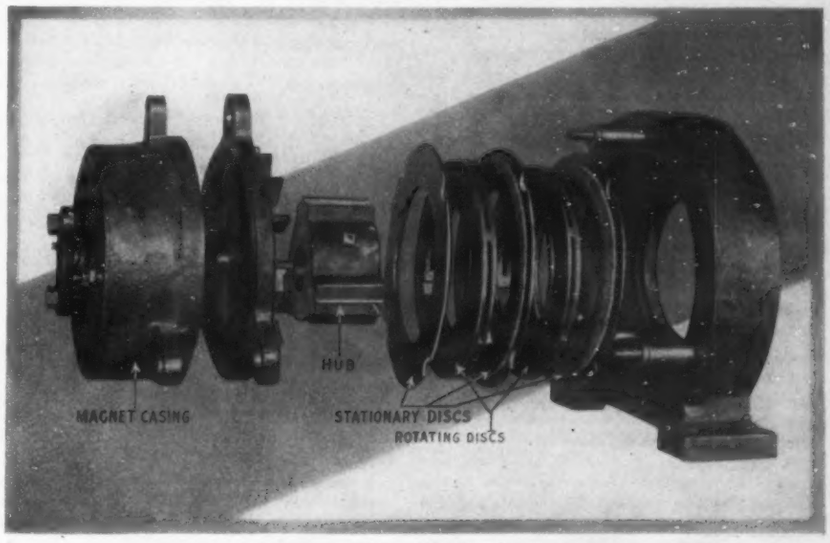


FIG. 3—EXPLODED VIEW OF MAGNETIC DISC BRAKE

passages. Normally, the stationary and rotating discs are pressed into frictional engagement by means of a spiral compression spring. The electro-magnet serves to compress this spring and release the pressure on the discs when it is desired to release the brake. The intensity of the braking force can be adjusted at will and the brake application and release are made without shock or hammer. The actuating forces being balanced within the brake, it is claimed that there is no end thrust imposed on the shaft.

The friction linings on the stationary discs are made from a product consisting of a weave of asbestos and brass wire and are riveted to the stationary discs by countersunk copper rivets. The material for these linings was chosen on account of its wearing and braking qualities, determined by a series of tests. The coils are thoroughly impregnated with an insulating compound.

Magnetic disc brakes are usually selected more or less by guess because manufacturers give nothing but a horsepower rating. This is rather indefinite, as the size of brake required depends to a great extent on other factors of service. To eliminate this uncertainty and allow the selection of the proper size brake for all cases, the new brakes are rated in horsepower, maximum torque in pounds—feet and capacity in foot-pounds per minute. For different kinds of service, such as for crane, hoists or rolling mill screw-downs, the brake best suited to the purpose can be selected from the data given.

TRADE PUBLICATIONS

AIR COMPRESSORS. — The Clayton Air Compressor Works of the International Steam Pump Co., New York, has issued a catalog in Spanish which is devoted to its extensive line of air compressors and accessories.

CONDUIT PRODUCTS.—In a 100-page catalog the Sprague Electric Works of the General Electric Co., New York City, illustrates and describes its extensive line of conduit products for electrical purposes. Prices are included with such details as sizes, etc.

PNEUMATIC TOOLS.—A 48-page bulletin, issued by the Chicago Pneumatic Tool Co., Chicago, is devoted to this company's line of air-operated drills, reamers, wood borers, flue rolling and tapping machines and grinders. The bulletin is well-illustrated and contains details of the construction and operation of these various tools.

MALLEABLE CASTINGS. — A 52-page catalog issued by the St. Louis Malleable Casting Co., St. Louis, is devoted to its extensive line of products, consisting of a miscellaneous line of malleable and gray iron castings. A number of specialties are shown, including washers of various types, crown nuts, railroad and agricultural castings wagon hardware, etc.

WIRE WHEELS.—In a 20-page pamphlet entitled "The American Wire Wheel News", the American Steel & Wire Co. describes and illustrates the design and construction of wire wheels, principally for automobile use. Other interesting data are included covering wire wheel manufacture which should prove of interest to those engaged in this or similar lines of work.

VALVES.—The Harrison Safety Boiler Works, Philadelphia, have published a 52-page, illustrated booklet entitled "Evolution of the Cochrane Multiport Valve", which describes the development of this device. This device is used both as a back pressure valve in connection with exhaust steam heating and drying plants, low-pressure turbines, etc., and as an atmospheric relief valve for condensers.

VERTICAL AIR-COMPRESSORS.—The Gardner Governor Co., Quincy, Ill., has issued a handsomely-illustrated 16-page bulletin describing its high-speed vertical air-compressors. It is stated that these compressors are composed of but few parts, have no outside adjustments, and are capable of being operated at high speed, which permits them to be direct-connected to motors, thereby avoiding the cost of countershafts. The high-pressure machines have splash lubrication, while the low pressure machines are lubricated with grease. Compressors are made in capacities from 8 to 140 cubic feet of free air per minute.

STOPPERS.—In an attractive 30-page booklet, the Joseph Dixon Crucible Co., Jersey City, N. J., illustrates and describes its lines of plumbago stoppers, nozzles and sleeves. While a wide variety of styles and sizes are shown, many other types are manufactured. In making the stoppers for steel ladle use the grain of the plumbago always runs lengthwise and never crosswise and as a result the stoppers are less liable to pull loose when the stopper head freezes to the nozzle.

DOUBLE TRUSS CORNICE BRAKE.—A 32-page illustrated catalog recently issued by the Double Truss Cornice Brake Co., Buffalo, describes its cornice brakes for forming sheet metal. It is claimed that these machines will bend or form sheet metal to almost any angle or curve, or any combination of angles or curves, not only on the edge of the metal, but at any distance from the edge, either crosswise or lengthwise of the sheet. A gutter forming machine is also described.

DUST COLLECTING SYSTEMS. — In a 16-page catalog the Cleveland Blow Pipe & Mfg. Co., Cleveland, illustrates and describes its various appliances used in dust collecting systems for emery, buffing and polishing wheels, grinders, emery belts and other dust producing machinery. This equipment includes adjustable hoods of various types, vacuum hoods, dust separators, exhaust fans, blast and exhaust blow piping, etc. A partial list of users also is noted.

RELIEF VALVE.—In a four-page bulletin issued by the Connersville Blower Co., Connersville, Ind., a new type of non-vibrating relief valve is illustrated and described. This valve is intended for blower service and is absolutely free from vibration. The valve can be placed anywhere in the air line, preferably near the blower, and is connected into the line by a short nipple of standard iron pipe size. It can be adjusted to maintain any desired pressure between eight ounces and two pounds. It is built in two sizes, 1½ and 2½ inches, although any special size will be made.

AUTOMATIC CONTROLLERS.—A series of bulletins has been issued by the Cutler-Hammer Mfg. Co., Milwaukee, illustrating and describing its new line of automatic controllers for use with slip ring poly-phase motors operating on low or high voltage circuits. New types of magnetic switches are used on these controllers. Four bulletins, also issued by this company, describe types of automatic starters for direct current motors which are used in place of hand starters where it is desired to get proper acceleration regardless of the carelessness of the workman and where convenience of control is essential.

REINFORCED CONCRETE PAVEMENTS AND ROADWAYS.—The American Steel & Wire Co., Chicago, has issued a very attractive, illustrated booklet giving some valuable information on reinforced concrete pavements and roadways. The book summarizes the advantages of triangle mesh wire in concrete pavement construction, gives tables of comparative costs, wire tables, construction methods, examples of pavements in service, and tables showing quantities of material required for one cubic yard of rammed concrete. The information in this book should prove of value to engineers and contractors.

AIR COMPRESSORS.—A 48-page bulletin, issued by the Chicago Pneumatic Tool Co., Chicago, is devoted to the complete compressor line manufactured by this company and treats particularly of general engineering information of value to users of compressed air. It contains tables giving efficiencies of air compression at different altitudes, density of gases and vapors, mean effective pressures and horsepower, loss of pressure due to friction in pipes, etc. Views of various types of compressors are shown in miniature as well as illustrations of the interior of the Chicago Pneumatic Tool Co.'s compressor plant at Franklin, Pa.

MOLDING MACHINES.—A handsomely illustrated and well arranged, 68-page catalog, devoted to molding machines and accessories, has been issued by the Osborn Mfg. Co., Cleveland. This line includes plain jolt-ramming machines of various sizes and types, portable pattern-drawing machines, special type jolt machines with pattern-drawing equipment, direct-draw roll-over jolt-ramming machine, roll-over rock-down machine, direct-draw roll-over for hand and machine operation, rock-over drop-draft, drop-plate flask-stripping, deep-draft stripping-plate, drop-plate squeezer and plain squeezer. The accessories manufactured by this company include vibrators, snap flasks and trimmings, etc. The catalog is well illustrated with views of various shops, showing the lines of work to which these different machines are adapted. Concrete examples of the capacities of these machines are included in the views of molding floors, showing the day's output of the operator by machine-molding methods.

LARGER IMPORTS

Of Iron and Steel in May—Exports Show Decrease.

Tonnage exports of iron and steel in May showed a decline from April and were only 79 per cent of those in May, 1912. Imports were heavier than in any month since June, 1911, being almost double those of May, last year.

IRON AND STEEL EXPORTS, GROSS TONS.

	May,		Eleven months ending May,	
	1912.	1913.	1912.	1913.
Scrap	10,453	7,235	75,008	97,206
Pig iron	28,156	19,527	158,833	264,238
Billets, sheet bars, etc.	36,070	9,361	210,581	223,406
Wire rods	6 977	8,906	42,940	69,530
Rails	60,306	32,097	369,226	408,571
Steel bars	15,772	18,200	131.175	214,841
Iron bars	2,563	1,005	14,302	22,145
Structural	23,137	37,382	219,534	328,901
Hoop, band and scroll	1,234	1,120	7,438	17,146
Sheets and plates	53,910	42,318	417,495	501,380
Tin plates	10,219	5.764	71,977	67,800
Barbed wire	10,604	7,488	95,176	81,420
All oth. wire	17,344	10,810	128,874	125,920
Cut nails	1,414	148	10,106	4,630
Wire nails	5,448	3,734	57 872	50,703
All other, including tacks	1,114	376	11,536	3,980
Pipes and fittings	22,797	32,498	210,742	254,036
Railroad spikes	*	1,112	*	11,737
Bolts, nuts, rivets, washers	*	2,381	*	19,456
Horse shoes	*	131	*	1,070
Cast radiators	240	599	3,795	7,835
Total	307,758	242,192	2,236,610	2,775,951

*Not stated prior to July 1, 1912.

Exports totaled 242,192 tons and imports 28,572 tons.

The value of exports, in both tonnage and non-tonnage lines, was $26,718,970, a decrease of $400,000 from

IRON AND STEEL IMPORTS, GROSS TONS.

	May,		Eleven months ending May.	
	1912.	1913.	1912.	1913.
Scrap	3,234	2,198	13,068	35,494
Pig iron	8,047	13,795	100,967	141,663
Blooms, billets, steel, n. e. s.	989	2,138	21,062	18,604
Wire rods	1,102	1,961	12,885	14,907
Rails	308	781	2,989	4,427
Bar iron	1,935	2,939	20,990	27,328
Structural	140	1,398	2,801	6,260
Sheets and plates	86	500	2,312	3,557
Tin plates	108	2 862	2,796	4,927
Totals	15,949	28,572	179.870	257,167

April and of $600,000 from May, 1912. The value of iron and steel exports in the first five months of this year, is well ahead of the corresponding period of 1912, May being the first month which failed to exceed the corresponding month of last year. The value of exports for the first six months of this years will be practically equal to the total for 1909.

Most of the more important items in the tonnage lines, showed a decrease in exports last month from May, 1912. Exports of structural material however was 37,382 tons in May, 1913, against 23,137 tons in May, 1912. Corresponding figures for pipes and fittings were 32,498 tons and 22,797 tons.

For the fiscal year ending with June, 1913, the exports of tonnage lines of iron and steel will exceed 3,000,000 tons, the record-holding calendar year being 1912 with 2,948,466 tons.

Imports of tin plates were as heavy in May, is in the preceding 12 months. Pig iron imports showed a large gain over May, 1912.

Iron ore imports were 191,860 tons, being the heaviest of any month this year.

IMPORTS BY MONTHS.

	1910.	1911.	1912.	1913.
January	56,207	33,071	20,008	21,741
February	43,613	20,812	11,622	24,904
March	54,176	23,533	15,466	27,247
April	47,698	22 392	12,481	25,743
May	42,569	23,347	15.949	28,572
June	30,322	29,399	21,407	.....
July	41,933	15,782	17,916	.....
August	36,879	10,944	20,572	.....
September	30 961	14,039	18,740	.....
October	31,455	21,035	25,559	.....
November	40,585	13,280	24.154	.....
December	31,575	19,665	21,231	.....
Totals	487,973	256,903	225,072	128,207

IRON ORE IMPORTS, BY MONTHS.

	1910.	1911.	1912.	1913.
January	284,823	102,600	154,118	175,463
February	170,427	94,820	129,693	188,734
March	163 633	134,785	157,469	64,865
April	206,135	133.900	178,502	174,162
May	240,833	217,467	194,482	191,860
June	193,415	118,296	180.122	.....
July	248,810	200.845	185,677	.....
August	282,949	175 183	178,828	.....
September	208,892	164 456	180,571	.....
October	219,571	172,459	202,125	.....
November	197.833	128,019	163,017	.....
December	173,710	148,902	199,982	.....
Totals	2,591,031	1,811,732	2 104,576	895,084

Chain Company's New Plant

The American Chain Co., Bridgeport, Conn., which bought out the chain department of the Oneida Community, Ltd., Oneida, N. Y., located at Sherrill, N. Y., is erecting a new plant at East Bridgeport, which will be completed about Aug. 1. This will include a three-story and basement, 50 x 211-foot structure, and a one-story, saw-tooth roof, 106 x 240-foot building. In it will be consolidated the three departments of the company, now located in Sherrill, New York City and Bridgeport. W. B. Lasher is president and treasurer of the company; Bishop White, vice president and general manager, and W. M. Wheeler, secretary. All kinds of weldless chain will be manufactured at the new plant.

Dominion Steel Earnings

Toronto, Canada, July 7.—The output of the Dominion Steel Corporation, of Sydney, N. S., for June was as follows, in tons: Pig iron, 33,138; steel ingots, 32,566; blooms, 26,683; rails, 19,500; rods, 2,930; bar and rod mill, 1,734; wire and nail mills, 2,000. The open-hearth and rail mill made new records. The output of the Dominion Coal Co. was 394,386 tons, or about 3,000 tons over that of June, 1912. For the first six months of the year the coal output was 2,294,069 tons, an increase of about 170,000 tons over the corresponding period of 1912.

May Relight Virginia Stack

David Flickwir, a railroad contractor, of Roanoke, Va., has bought the blast furnace plant of the West End Furnace Co., at Roanoke, Va. He has also gained ownership of the iron ore mines at Interior, Va., which formerly were operated in connection with the furnace. While no statement of his plans has yet been made by Mr. Flickwir, it is expected arrangements will be made for operating furnace.

Spanish Ore Trade

The Middlesbrough, Eng., correspondent of The Iron and Coal Trades Review, commenting on the Spanish ore trade in the issue of June 27, says:

"The foreign ore trade continues dull, and sellers still quote 20s for best Bilbao rubio of 50 per cent quality, ex-ship Tees."

VALUE OF IRON AND STEEL EXPORTS—TONNAGE AND NON-TONNAGE.

	1909.	1910.	1911.	1912.	1913.
January	$10,329,388	$14,513,394	$18,738,391	$18,451,914	$25,141,409
February	10,947,159	13,949,082	18 690,792	21,801 570	24,085,871
March	13,873,746	17,253,503	22,591,991	24,474,799	27,201,197
April	13 058,297	16,529,260	24,916,912	26,789.853	27,123,044
May	12,964,367	17,658,042	20,616,795	27,332,701	26 718,970
June	13,779,736	16,503,204	20,310,053	24 795,802	.....
July	11,866,772	16,108,102	17,454,772	24,913,052	.....
August	14 134,487	17,628,537	20,013,557	25,450,107	.....
September	12,966,908	16,776,178	19,875,308	23,286.040	.....
October	14,249,598	17,452,085	20,220,833	25 273.059	.....
November	14,434,690	18,594,806	20,823,061	26,406,425	.....
December	15.059,246	18,300,710	22,186,996	23 750,864	.....
Totals	$157,674,394	$201,271,903	$249,656,411	$289,128,420	$130 270,491

EXPORTS OF TONNAGE LINES—GROSS TONS.

	1909.	1910.	1911.	1912.	1913.
January	70,109	118.681	152,362	151,575	249,532
February	84,837	110,224	150.919	204,969	241,874
March	94,519	124,980	216,360	218,219	257,053
April	100 911	117,921	228,149	267 313	260,440
May	109,808	135,306	178,589	307,758	242,192
June	114,724	120,601	174,247	273,185	.....
July	100,850	127,578	162,855	272,944	.....
August	105,690	131,391	177 902	282,835	.....
September	97.641	119,155	181,150	248,746	.....
October	110,821	129,828	186,457	250,611	.....
November	116,105	155,138	187,554	233,341	.....
December	137 806	150,102	190,854	235,931	.....
Totals	1 243,567	1,540,895	2,187,724	2,948,466	1,251,091

THE IRON TRADE REVIEW

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Rensselaer's Wise Policy

The mechanical equipment in college engineering laboratories is generally free from signs of severe usage, differing in this respect from the equipment in most industrial plants. In fact, machinery at the engineering schools presents the appearance of being more looked at than actually used.

The duration of the period of usefulness of most college apparatus is therefore dependent more upon the ability and inclination of the college authorities to make replacements than upon the amount of wear and tear to which each machine is subjected.

Such replacements are frequently made necessary by reason of the many improvements and alterations in mechanical design and construction which are constantly being made. As a result, machines which a few years ago were classed as modern are now, through the march of progress, regarded as obsolete.

These replacements require the expenditure of money, and sometimes a great deal of it. In this respect, a great many colleges are handicapped, having to depend to a large extent upon occasional gifts from trustees and alumni. Then, too, constant demands are made on a college pocketbook from one source and another, so that the tendency sometimes is to postpone improvements to the mechanical equipment "for another year".

Rensselaer Polytechnic Institute, Troy, N. Y., the oldest engineering school in any English speaking country, is more fortunate in this connection than the average institution of engineering education. In 1906, this school established two new courses, the department of mechanical engineering and the department of electrical engineering. In that same year occurred the death of Russell Sage, and in 1907 his widow contributed a sum of $1,000,000 to Rensselaer, no strings of any kind being attached to the gift.

The Institute thereupon started work on the new Russell Sage Laboratory, which in the course of time was completed and dedicated to the use of the departments of mechanical and electrical engineering. It was built and equipped at a cost of $405,000, of which $300,000 was taken from the amount donated by Mrs. Sage. The equipment was the most modern that it was possible to buy.

The remainder, or $700,000, of Mrs. Sage's gift was set aside as a perpetual fund, the income of which is to go to the proper maintenance of the new laboratory. In this way, Rensselaer has wisely solved the problem of keeping abreast of the times. As a result, numerous improvements and additions have already been made to the equipment in the laboratory.

Hypocrisy of Some Opposition to Corporations

The recent hearings before the Senate committee investigating lobbyists have disclosed among other things the hypocrisy of much of the agitation against corporations on the part of professional lobbyists, and particularly the so-called Anti-Trust League. Strange alliances, trickery, and amazing manipulations were features of the attack on corporations disclosed by the investigation. Particularly interesting was the testimony relating to the resolution providing for an investigation of the United States Steel Corporation.

A man, styling himself David H. Lamar, but admitting the name is an alias, told the senate committee, in a remarkable story of intrigue, that he drafted the resolution which resulted in the investigation of the Corporation. It was introduced by Congressman Stanley, of Kentucky, Lamar said, and passed in substantially the form which he, Lamar, had drawn it. This fellow Lamar, known as the "wolf of Wall street", said that the resolution was drawn at the request of Henry B. Martin, secretary of the so-called Anti-Trust League, an organization which has been enveloped in much mystery, and which, on the floor of the House about a year ago, was denounced as a purely mythical organization possessing no membership except the officers mentioned on the letterheads. Lamar said the resolution was used as a club to compel officials of the Corporation and the Morgan interests to restore Attorney Edward Lauterbach to the good graces of J. P. Morgan & Co. Promise was made, Lamar said, that through influence with prominent members of congress in both houses, an investigation could be prevented, and would be, if Lauterbach were put on the pay roll.

Lamar further testified that the Corporation and the Morgan firm officials strongly repulsed these

advances and the Corporation officials even invited the investigation.

Martin, on the stand, corroborated that part of Lamar's testimony dealing with the drafting of the resolution. Martin said he requested Lamar to draft it and that he, Martin, as a member of the Anti-Trust League, had handed the resolution to a congressman. Martin said the resolution was adopted by the house in substantially the form which he delivered it to the congressman.

Following Martin's testimony, Congressman Stanley issued a statement saying he himself prepared the resolutions and neither Henry B. Martin nor anyone else had anything to do with them more than furnishing data on which they were based. Mr. Stanley said he introduced three resolutions providing for the investigation of the Corporation. One went to the judiciary committee and the other two to the rules committee. The measure which finally passed, Mr. Stanley went on to say, was so changed by the committee on rules that it really was a committee measure.

Whether Martin or Lamar wrote the resolution, or merely furnished data to enable Mr. Stanley to do so, is not material. It is clear, however, that Lamar and Martin were more or less connected with the resolution which provided for the investigation of the Steel Corporation. Lewis Cass Ledyard, the well-known New York attorney, testified that he had his information as to Lamar's authorship of the Stanley resolution from Lamar himself, who, after drafting it, turned it over to Lauterbach to use in intimidating Morgan representatives into an agreeable attitude toward Lauterbach. Whether this is true or not, it shows at least the evil intention which was in the mind of this man Lamar.

Martin's testimony regarding the Anti-Trust League was extremely vague. He successfully demurred at revealing the names of the League's members. He begged the committee not to compel him to tell how he had spent the $50,000 collected by the "League" from all over the country during its existence. He said he had no stipulated salary, but, on long trips, part of his expenses were paid by the organization. He refused to say who authorized these appropriations and who audited his accounts. All these and other items about the "League" are suppressed, said Martin, because the "interests" would otherwise get access to information and use it in a campaign of persecution.

Such is the organization which, under the pretense of serving the people, has been hounding business men and attempting to break up great business organizations. No one who has the best interests of the country at heart will object to vigorous prosecution of the anti-trust laws, if properly conducted, but that neither Lamar nor Martin is entitled to any consideration at the hands of the congressional committee has been clearly shown by the recent investigation, which, if it does no other good, will at least demonstrate that iniquitous forces, under the guise of virtuous attempts to enforce the laws, have been exerted against some of the great business organizations.

That Endless Chain

The action of the conductors and trainmen of eastern railroads in deciding to quit work if their leaders give the word means that the managers of the eastern railroads must grant increases in pay amounting to $17,000,000, or 20 per cent per annum, or face the certainty of a strike, unless arbitration should be agreed upon. According to President Lee, of the trainmen's brotherhood, the conductors and trainmen of the eastern railroads received increases amounting to $30,000,000 per annum in 1910. The engineers, in 1912, were given an annual increase of $2,000,000, and in May, 1913, the firemen received an advance of $3,750,000 per annum. Naturally the question is asked—How long shall this process of increase be allowed to continue unchecked? Ex-president Roosevelt, in a recent article in the *Outlook*, under the title "The Living Wage and the Living Rate", declares that if the railroads are entitled to an advance in rates, there should be no hesitation about giving it to them. Col. Roosevelt says in part:

"Unless the corporation makes money—that is, unless business men are prosperous—there will be no money to give in proper wages for the wage-worker, there will be no money with which to provide for his protection and to insure him against loss and damage, and no money wherewith to render proper service to the customers and to the public as a whole. Whether the reward comes in the way of big salary to the big manager, who makes the business a success, or of dividends to the big or small man, who invests money in it, the principle is the same. Our purpose is to see that there is proper division of prosperity. But there can be no division unless the prosperity is there to divide. One of the methods by which the prosperity will certainly be abolished is to draw the line against size and efficiency instead of against misconduct. Another way to destroy it is to impose burdens, however necessary and proper, without facing the fact that someone must pay for the burdens, and that if the investor cannot pay for them and at the same time get a reasonable return on his investment, then either the business will close or the public must share the burden with the investor."

There will be general agreement with the sentiments expressed by the ex-president, but the endless chain of raising wages and raising rates, if unbroken, will reach the point where there will be no prosperity to divide. It seems to us that further demands for increases of wages might well be postponed until the recent request of the railroads to be allowed to make an increase of railroad rates could be thoroughly investigated.

MESTA BRIDGE

Built For Protection of 2,000 Employes, is Dedicated.

Officials of the Mesta Machine Co. and the Pennsylvania railroad attended exercises at the Mesta plant at West Homestead, Pa., June 28, when an overhead steel and concrete bridge, extending from the electric railway line on Seventh street to the administration building of the Mesta company, was formally dedicated. The bridge is 200 feet long, with a span of 122 feet, passes about 25 feet above a half dozen railway tracks and was built to protect the lives of the 2,000 employes of the Mesta company.

A buff brick waiting room, 20 x 45 feet, was erected near the street car line, at the crest of a hill which has been transformed into a small park, where more than 1,000 shrubs and bushes have been planted. A concrete walk leads from this station to the bridge, which extends to the second floor of the addition to the general office building. The addition, which is of brick and steel construction, is 42 x 53 feet, three stories. The time room and employment bureau are on the first floor, the reception room and superintendent's office on the second, and the costs and estimating departments are on the third floor.

A railroad waiting station, now known as Mesta, stands at the east approach to the bridge. It is 20 x 60 feet. Employes are not permitted to cross the tracks, and cannot enter the shops direct except by using the bridge. The main thoroughfare leading to the plant is used only by vehicles.

Mesta Machine Co. officials in charge of the exercises were: George Mesta, Fred E. Mesta, Jacob E. Mesta and Walter Hirth. Pennsylvania railroad officers present included: S. C. Long, general manager; R. L. O'Donnell, general superintendent of the western Pennsylvania division; G. W. Snyder, principal assistant engineer; A. G. Mitchell, superintendent of the Monongahela division; E. B. Wiseman, division engineer the Monongahela division, and R. T. Morrow, superintendent the Pittsburgh division. John A. Brashear and Prof. W. Trincks were among the guests.

A unique method of teaching a safety lesson has been adopted by the Brier Hill Steel Co., Youngstown, O., which is giving employes boxes of safety matches with the following advice pasted on the top of each box: "Safety First. Always look where you are going, watch what you are doing and clean up the scraps or rubbish that might harm you, your fellow-workmen, or the property of those who employ you. Safety is first, then quality, then tonnage."

OBITUARIES

Thomas Gassner Sr. died recently at his home in Philadelphia, from pneumonia. He was engaged in the cornice business for a number of years, and was, at the time of his death, proprietor of the Wayne Junction Metal Cornice Works. He was 56 years old.

Michael J. Norton, prominent in the iron business at Louisville, Ky., died in that city last week at the age of 70. He was a veteran of the civil war, serving with the Eleventh Indiana under Gen. Lew Wallace. He established the Star Foundry in Louisville, and after its failure organized the Kentucky Stove Co.

William H. J. Kieckhefer, who with his brother founded the present Milwaukee works of the National Enameling & Stamping Co., died at Milwaukee on July 1, after an illness lasting one year. Mr. Kieckhefer was born in Milwaukee March 15, 1857, and was actively identified with the growth of the city, becoming one of its wealthiest men. The firm of F. Kieckhefer & Bro., tinware, sheet iron, etc., made a fortune for the brothers. The concern was absorbed by the National Enameling & Stamping Co. several years ago and forms the largest unit of the Nesco group.

Car and Foundry Co. Report

President Frederick H. Eaton, of the American Car & Foundry Co., in the annual report for the year ended April 30, comments upon the unusual economic and financial conditions that now exist, but declares his belief that the immediate situation is of transitory character and eventually will be improved. Mr. Eaton remarks that the present conditions have contributed to the sharper drawing of competitive lines among car builders.

The financial report of the new company is favorable, showing an increase of $1,446,078 in net earnings. They were $700,495 less than 1911, however. The report, with comparisons for the preceding year, is as follows:

	1913.	1912.
Net earnings	5 539,829	4,193,751
*Renewals	2,211,236	1,354,519
Bal. available for divs.	3,328,593	2,829,232
Pfd. divs.	2,100,000	2,100,000
Balance	1,228,593	739 232
Com. divs.	600,000	600,000
Surplus	628,593	139,232
Main. and imp.	250,000	.....
Surplus	378,593	139,232
Prev. surplus	24,876,576	24,737,345
P. & L. surp.	25,255,109	24,876,576

*Renewals, replacements, repairs, etc.

GREATEST JUNE

In Iron Ore Shipments From the Lake Superior Regions.

Ore shipments during June were 7,974,444 gross tons as against 7,567,555 gross tons for June, 1912, an increase of 406,889 gross tons. The increase over shipments for June, 1911, is 3,154,448 gross tons and over June, 1910, which up to that time was the record movement for an early month, 657,852 gross tons. It is quite likely that the July movement will reach 8,000,000 tons, and the expected 50,000,000-ton movement for the present season will easily be attained. Following are the shipments by ports during June and up to July 1 with corresponding data for the preceding year.

Port.	June, 1912.	June, 1913.
Escanaba	849,059	845,414
Marquette	561,976	532 736
Ashland	811,029	774,761
Superior	2,348,608	2,377,078
Duluth	1,551,214	1,895,728
Two Harbors	1,445,669	1,548 727
	7,567,555	7,974,444
1913 increase		406,889

Port.	To July 1, 1912.	To July 1, 1913.
Escanaba	1,641,948	1,800,601
Marquette	918 890	1,059,776
Ashland	1,332,801	1,509,702
Superior	4,344,331	4,677,349
Duluth	2,845,478	3,995,948
Two Harbors	2,607,223	3,081,666
	13,690,671	16,125,042
1913 increase		2,434,371

Cincinnati's New Court House

The preliminary sketches for the new Hamilton County court house and jail, which is to be built in Cincinnati, are now in the hands of the commission appointed to oversee this work. Eleven Cincinnati architects and five non-resident architects have been chosen to submit sketches, from which one will be selected. Prof. Warren P. Laird, of the University of Pennsylvania, who is the consulting engineer for the building commission of the court house, and a jury of architects will judge the competition. The building will cost about $2,400,000 and will be begun about Jan. 1, 1914. The competing architects are Louis G. Dittoe, Harry Hake, Allyn Co., Tietig & Lee, Garber & Woodward, Bausmith & Drainie, A. Lincoln Fechheimer, Zettel & Rapp, Samuel Hannaford & Sons, Weber, Werner & Adkins and Henry N. Hooper, all of Cincinnati; Cass Gilbert, of New York; James Gamble Rogers, New York and Chicago; Kellogg & Crane, Philadelphia; Holabird & Roche, Chicago & New York, and Carreare & Hastings, New York, substituted for McKim, Meade & White, who declined the invitation.

FOREIGN MARKETS

BRITISH IRON TRADE

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., June 28.

Pig Iron.—The combined effect of strikes and the uncertain outlook in the east has made the position of pig iron extremely unsatisfactory, and so far there are hardly any signs of recovery. The worst effects of the slump are concentrated on the Birmingham district, where nearly all the works are closed, and most of the iron made is going into stock. At the Birmingham Exchange on Thursday, Northampton iron was quoted at 55s ($13.56), representing a fall of about 16s ($3.88) from the maximum. Other brands are in proportion. During the past few days there has been a slight recovery in Cleveland, yesterday's quotation being 54s 7d ($13.34) for prompt business with the same price for monthly transactions and 55s 6d ($13.58) three months. Apparently that market is steadying a little, but a check has been administered by the re-opening of trouble in the Balkans. The Lincolnshire makers recently made a sweeping reduction of 4s per ton, but their customers are still holding off, and asking for more concessions. Generally there is slightly more inquiry and there are signs that consumers are becoming anxious about future supplies. There are practically no contracts now in existence, and purchases are strictly for urgent, and almost day-to-day requirements. It is agreed that the first real indication of improvement must be followed by a vigorous buying movement. The amount in store at Cleveland is 215,000 tons, a figure highly significant of the real state of affairs, since stocks have reduced during June by about 20,000 tons, and shipments are well maintained. Various circumstances are giving buyers an advantage not altogether warranted by actual consumption of material. To some extent hematite has shared in the fall, material being offered on the East Coast at 76s ($18.50) for both early and forward delivery.

Finished Iron and Steel.—It is some years since the "Black Country" passed through such a miserable time as is now being experienced. The district has been completely disorganized by the strikes for the minimum wage. The great majority of the iron mills in the "Black Country" have been shut up for several weeks. The tube trade is stopped entirely, and the same may be said of the rolling stock trade, for which Birmingham is the largest British center. There are thousands of starving workers and their families all over the district, whose precarious income is obtained chiefly from street collecting boxes, and the small gifts contributed from newspaper and other relief funds. Several contingents are visiting different parts of the country, whose appeals are supplementing to some small extent the money raised in the district.

The stoppage of the tube and rolling stock trade has deprived the Staffordshire mills of their best customers. For some mysterious reason, the quotation for best part bar iron is kept at £10 per ton, but unmarked bars have had a severe fall, sales having been effected as low as £7 15s. Galvanized sheets, although being turned out in fairly large quantities, are falling rapidly in price, one order of 1,000 tons has been placed by a local merchant at £10 17s 6d. The steel trade keeps us wonderfully well, although very little new business is being placed. Many Sheffield firms have difficulty in executing their orders with sufficient rapidity to suit their customers.

There is keener competition in raw steel, for which prices are very weak. The quotation in Manchester for foreign steel delivered is 88s for 2-inch billets and 90s for sheet bars. Against these prices we have the Welsh quotation of fgrom £5 to £5*5s.

GERMAN IRON TRADE

Berlin, June 26.

A general decline in prices is to be noted here; in fact, during the past fortnight depressed conditions in the German iron trade have been intensified, although perhaps it is not expressed in public in its full extent. Thus the pig iron syndicate at its meeting last week was cheerful; all its customers had covered themselves for the second half year; shipments during May were very satisfactory and amounted to 10 per cent of the allotted contingent of members. No change was made in prices; but it is current gossip that offers much below the current home market parity have been made abroad—offers that would successfully compete in England with English iron, and that business has been done at deep cuts. The situation in the bar trade is said to be less acute; inside interests maintain that the only thing which has occurred is that some merchants have placed their orders for the third quarter at prices well below 100 marks ($23.50), the quotation adopted recently by the Dusseldorf Exchange.

At the general meeting of members of the German Steel Syndicate, it was pointed out by the administration that the demand for steel, both at home and abroad, had recently undergone a decline, in consequence of which it was decided to reduce, for the third quarter of 1913, the sale price of half-finished material by 5 marks ($1.14½) per ton. The position of heavy material had not experienced any change, and prices therefore were allowed to remain unaltered.

AUSTRIAN IRON TRADE

Vienna, June 26.—Metallurgical works in Bohemia and Galicia have recently experienced a slight improvement in the matter of sales. The Skoda Works are erecting a special factory for the manufacture of ammunition. The inland sales of the Austrian Iron Syndicate for May totalled 51,050 tons, representing a decline of 27,613 tons, as compared with the corresponding month of 1912. Since Jan. 1 the aggregate inland sales decreased 54,155 tons, to 290,952 tons.

BELGIAN IRON TRADE

Brussels, June 26.

Iron trade conditions in Belgium still remain depressed and further reductions in prices are to be noted. The course followed by prominent concerns appears to be as follows: An establishment wants orders; it cannot get them otherwise than by cutting well below the general quotation; it does make a cut, two, three or more francs, secures its business and forthwith restores its asking price to the old level. This process goes on from day to day, constituting a demoralized market. The nearest export values, at which business may or may not be done today, but has been done during the week, are £4 17s 6d ($23.73) to £4 17s ($23.61) for steel bars, with 1s (24½ cents) more for iron bars, £5 8s ($26.29) for rods, £5 10s to £5 12s ($26.77 to $27.26) for plates, £5 12s 6d to £5 15s ($27.38 to $27.99) for medium thickness, £5 17s 6d ($28.60) for thin sheets, f. o. b. Antwerp. At the close the tendency is said to be steadier.

TRADE NOTES

BETHLEHEM, PA.—The Bethlehem Steel Co. recently entertained the officers and cadets of the Argentine naval training ship, Presidente Sarmentio.

CHICAGO.—The Eagle Claw Wrench Co. has moved its general offices from 565 West Washington street to 36 West Randolph street. In the future the company's stock of wrenches will be carried at the plant in Rockford, Ill. J. A. Schlehr is president and Eugene Ambler secretary and treasurer of the Eagle Claw Wrench Co.

DETROIT.—The tenth annual outing of the Michigan and Detroit plants of the American Radiator Co. was held at Tashmoo park, Saturday, June 26.

JANESVILLE, WIS.—The Janesville Machine Co., Janesville, last week entertained 50 agents and traveling representatives, who gathered at the factory for their twentieth annual convention, lasting six days. Heads of all departments made addresses at the sessions, which took the form of a school of instruction.

MILWAUKEE.—The Ideal Plumbing, Heating & Contracting Co. has changed its name to Ideal Construction Co., and will extend its business and lines of activity.

MILWAUKEE. — All Milwaukee civic and commercial organizations will join in the reception to the 600 foreign delegates to the International Congress on Refrigeration, Chicago, who will spend two days in Milwaukee immediately after the close of the Chicago session. The American delegates, who will number about 500, will accompany the foreign engineers to Milwaukee.

NORTH ANDOVER, MASS.—The Davis & Furber Machine Co. is planning to shut down its entire plant during August. During that time the ground floor of the plant will be relaid and the shafting of the shop refitted.

PHILADELPHIA.—Walter C. Harris, receiver for the Dunbar Furnace Company, recently filed the first and final account of the affairs of the company. The papers were presented to the court on July 7 for a decision.

PITTSBURGH. — A "Metallurgical and Mining Section" has been urged by members of the Engineers Society of Western Pennsylvania. At a meeting Sept. 16 a vote will be taken on the formation of this section. The society now has a membership roll of 1,135, of whom 986 are active members.

PITTSBURGH.—The Pittsburgh Industrial Development Commission has issued a "Pittsburgh Commodity Index" which alphabetically indicates Pittsburgh manufacturing interests, plant locations, officers, etc. Approximately 20,000 commodities are listed in the index, representing the products of more than 1,600 manufacturers and nearly 800 jobbers.

SEATTLE.—The Lidgerwood Mfg. Co., 96 Liberty street, New York City, has opened a large jobbing house at 809 Western avenue, Seattle, and will carry a complete line of heavy logging, mining and grading equipment for immediate delivery. W. H. Dickinson is northwestern manager of this company.

TRENTON, N. J.—Frederick L. Johnston, of Newark, has been appointed receiver for the Titan Steel Castings Co.

TRENTON, N. J.—A voluntary petition in bankruptcy has been filed by the Bayonne Scrap Iron & Metal Co., 88 West Seventh street, Bayonne. The company has liabilities of $5,231 and assets of $140.

TRENTON, N. J.—Proceedings have been filed asking that the Middlesex Bridge Co., New Brunswick, N. J., be declared bankrupt. James A. Coe & Co., of Newark, are among the creditors who charge that the company is insolvent. A. C. Streitwolf, of New Brunswick, has been appointed receiver.

WAUKESHA, WIS.—The Modern Steel Structural Co. has increased the number of its directors from five to seven, according to an amendment to its articles filed July 2.

YOUNGSTOWN, O.—Employes of the local plant of the Carnegie Steel Co. gave an outing at Conneaut Lake July 5.

MEN OF THE IRON TRADE

JAMES N. HEALD, treasurer of the Heald Machine Co., Worcester, Mass., has returned from a six weeks European trip.

HARVEY HUBBELL, of the Harvey Hubbell Co., Inc., Bridgeport, Conn., has sailed for a six weeks' trip through Europe.

GEORGE IRVING has been appointed Canadian manager for the National Meter Co., of New York, with headquarters in Winnipeg.

B. F. BOURNE, of the Bourne-Fuller Co., Cleveland, sailed last week for Europe. Mr. Bourne plans to spend some time in Switzerland.

CHARLES M. SCHWAB, president of the Bethlehem Steel Corporation, who has been abroad on a business mission, returned by the Olympic, July 2.

GEORGE H. BURKE, for several years manager of the New York office of the Sarco Engineering Co., opened an office for the company in Chicago July 1.

M. T. HARMON, for several years special traveler for the Standard Separator Co., Milwaukee, has been promoted to the position of credit manager.

EUGENE P. THOMAS, president of the United States Steel Products Co., who has been abroad in the interests of his company, returned to New York, July 2.

PROF. V. SMART, of the department of railway engineering at McGill University, has been appointed general manager for the General Railway Signal Co., of Canada.

W. C. WEAVER, of the faculty of the Carnegie Institute of Technology, has been appointed instructor in engineering in the extension division of the University of Wisconsin, Madison. He will assume his duties August 1.

HUGH CHALMERS, president of the Chalmers Motor Co., Detroit, Mich., who recently was operated upon for appendicitis, is recovering at his farm near Detroit.

C. J. NEPHLER has resigned as manager of Bradley, Alderson & Co., Kansas City, to become general sales manager of the Oliver Chilled Plow Works, South Bend, Ind.

BENJAMIN E. PURSER has become general superintendent of the mines of the Woodward Iron Co., Bessemer, Ala. I. V. Dalrymple has been appointed his assistant.

F. W. BIEHL has been elected a director and treasurer of the Galion Iron Co., Galion, O., to succeed H. Gottdiener, resigned. Mr. Biehl is also a director of the Cleveland-Galion Motor Truck Co.

JOHN J. MURPHY, Kansas City, has joined the sales force of the Nebraska Moline Plow Co. William Thorpe, former manager of the Rumely Products Co. branch at Winnipeg, Man., also has joined the Moline company.

H. W. WILLIAMS, for two years connected with the Pittsburgh office of the Electric Controller & Mfg. Co., Cleveland, has been appointed manager of the office at Chicago, succeeding W. M. Connelley, resigned.

HOWARD I. SHEPHERD has tendered his resignation as secretary and assistant treasurer of the Toledo Shipbuilding Co., Toledo, O., to accept the vice-presidency of the Ohio Savings Bank & Trust Co. Mr. Shepherd has been a strong factor in increasing the efficiency of the big shipbuilding plant which is capitalized at $2,000,000, being one of the original incorporators.

J. W. BOILEAU spoke on "The Pittsburgh Bed of Coal; Its Origin, After Influences and Quality; Its Distribution as to Quality; Its Markets; and Its Tonnages," at a meeting of the Coal Mining Institute at Pittsburgh last week.

F. J. FINUCANE has been elected president of the Holley-Mason Hardware Co., Seattle, to succeed the late Fred. H. Mason. Roy R. Gill was elected vice president and general manger and C. A. Bartleson secretary and treasurer.

J. C. McILROY has been given the management of the Cleveland branch house of the Merchant & Evans Co. Mr. McIlroy has been a traveling representative of the company for years, with headquarters in Detroit. The Cleveland headquarters are at 1111 Superior viaduct.

ARTHUR S. HERBERT has been appointed general manager of the branch offices of the Siemens Co. in Australia. Mr. Herbert was formerly general manager of the Siemens Co., of Canada, and will be succeeded by C. A. Ablett, who has had much experience in the electrification of rolling mills.

JOHN O. O'KEEFE, superintendent of the Sharon works of the American Steel & Wire Co. for the past five years, has retired on a pension. He has been succeeded by August Mann, Anderson, Ind. Mr. O'Keefe had been connected with the American Sheet & Tin Plate Co. for 40 years, rising from a laborer to superintendent. He will live a retired life at Cleveland.

NEW BUSINESS

Reports show that the condition of the machinery market at the different centers varies to a greater degree than for some time previously, indicating a break in the dullness that held through the latter part of May and the month of June. Although extensive buying is not expected before September, it is believed that the volume of business placed before that time will be sufficient supplement to the present unfilled orders to keep practically all shops running at full capacity.

In New York, machinery dealers have been asked to submit bids on two machine tool lists. One of these represents government requirements at the Mare Island Naval Station, consisting of a dozen or more lathes, drills, grinders, etc. The Virginia Polytechnic Institute, Blacksburgh, Va., distributed specifications on between $30,000 and $40,000 worth of metal working tools. Bids on the latter were requested to be sent in by July 1, and delivery before the school reopens in the autumn. The large list sent out by the government in May, amounting to about $500,000, has been closed, the business being distributed among a number of houses. Officials of the Lackawanna railroad gave out information that point to early final action on bids that have been under consideration for several weeks.

In Pittsburgh, machine tool builers and dealers are experiencing the usual midsummer lull, which generally extends through July and August. No large inquiries for machine tools are out and no orders of consequence have been placed. Builders of heavy machinery say inquiries are fair, but buyers show little or no desire to close transactions.

In Cleveland, several good orders and inquiries have been noted. During the past week one house received orders from within the state for six milling machines, one boring mill, one gear-hobbing machine, five lathes, two grinders, besides numerous smaller machines. Small electrical machinery continues in good demand, by virtue of several companies installing individual electric drive. Supply and second-hand machinery business is brisk.

In Cincinnati, the machinery market shows no improvement. Very few new orders have been taken recently and practically all the activity shown at present is in getting out old contracts. Several of the shops are only working half time and the Lodge & Shipley Machine Tool Co., one of the largest in the city, has curtailed operations for a week or more. Orders are generally for single tools and are about evenly divided between export and domestic trade. Second-hand machinery business is very dull. It is shown that several large buyers, such as the railroads, are in need of machine tools, but they are holding off pending further developments in the market.

ALABAMA

BESSEMER.—The Bessemer Soil Pipe & Foundry Co., which has been running on half time, resumed work in full last week.

BIRMINGHAM.—The Tennessee Coal, Iron & Railway Co. may supply electric power for the new Steel Corporation wire mills at Fairfield. Work has been started by the Ensley Land Co. on 75 houses to be built at Fairfield for employes of the big works.

ARIZONA

BISBEE.—The Adina Copper Mining Co. has been incorporated; $3,750,000; by F. J. Bailey, K. W. Goff, B. L. Davey, F. Tikkanen and L. Lindros.

ARKANSAS

LITTLE ROCK.—The Stuttgart Foundry & Machine Co., recently incorporated, will succeed the Rosh-White Co., which went into bankruptcy a few weeks ago. (Incorporation noted July 3.)

CALIFORNIA

LONG BEACH.—The Electrical & Mechanical Mfg. Co. has made arrangements to begin the erection of the main building of its proposed plant in the industrial district near Paul Jones street. The building will be 100 x 100 feet and constructed of steel and galvanized iron.

LOS ANGELES.—The plant of the Monarch Foundry Co., 2210 East Fifty-second street, was damaged by fire recently.

COLORADO

DENVER.—The Colorado Fuel & Iron Co. and the Rocky Mountain Fuel Co. are reported to be negotiating a deal whereby the latter company will obtain ownership of all C. F. & I. properties on what is known as the western slope.

CONNECTICUT

BRIDGEPORT.—L. Hommedien, a salesman for the Bridgeport Crucible Co., has placed on the market a cover for use on crucibles.

BRIDGEPORT.—The Hawthorne Mfg. Co., manufacturer of automobile horns, etc., which, for several months has considered plans for a new plant, has decided to begin work this fall.

NEW MILFORD.—The Kilborn Mfg. Co. has been incorporated to manufacture brass ware, etc.; $100,000; by H. E. Kilborn, M. P. Kilborn, both of New Milford, and C. A. Postley, of New York City.

NEW LONDON.—The plant of the Hopson & Chapin Co. will be closed permanently at the end of this month. The company made heating systems, engine cylinders and other castings.

DISTRICT OF COLUMBIA

WASHINGTON.—The general purchasing officer, Isthmian canal commission, will receive bids until July 14 for concrete handling cranes.

WASHINGTON.—Proposals for a motor-driven extension planer, 96 x 132 inches x 24 feet, structural steel, etc., will be received at the office of the general purchasing agent, Isthmian canal commission, until July 23. Blanks and general information relating to these requirements (Circular No. 784) may be obtained from F. C. Boggs, Major Corp of Engineers, U. S. A., general purchasing officer.

WASHINGTON.—The following foreign trade opportunities are noted in the Daily Consular and Trade Reports. Inquiries in which addresses are submitted are on file at the bureau of foreign and domestic commerce. In applying for addresses refer to file number:

No. 11213. Floating docks, cranes, etc.—Consul General John B. Jackson, of Bucharest, reports that the Roumanian government contemplates a further increase in the port facilities at Constanza, as well as the installation of cranes, etc., at several Danubian ports, the construction of a floating dock, to cost about 1,200,000 francs ($231,600), and various other improvements, representing an expenditure of about 2,000,000 francs (($386,000). Those interested should communicate, preferably in French, with the Ministry of Public Works, Bucharest.

No. 11236. Machinery and cranes.—An American consul reports from the East Indies that an important native firm which has a large business in the sale of supplies for certain gold mines and for the army

desires catalogs and other information concerning American saw mill machinery, cranes and cement, brick and tile-making machinery, with a view, if feasible, to introduce such articles into certain Province.

WASHINGTON.—The Commissioners of the District of Columbia, will receive bids until 2 p. m., July 16, for 2,370 net tons of cast iron pipe for use in the water department of that city.

FLORIDA

JACKSONVILLE.—The Mains Foundry Co. recently applied for incorporation with a capital of $15,000, to operate a foundry in Jacksonville. Application was made by M. C. Mains, H. C. Leunig and F. W. Brown.

JACKSONVILLE.—The Southern Steel & Iron Works, founders and machinists, advises it expects to rebuild. A machine shop and a gray iron and steel foundry will be built. A 500-horsepower oil engine, electric generating outfit and pattern-making machinery operated by independent motors will be installed. The H. G. Perring Engineering Co., Jacksonville, will have plans ready in thirty days.

GEORGIA

BREMEN.—The Bremen Machine Works has re-opened its plant.

CAIRO.—The P. & H. railroad is erecting a machine shop and roundhouse at this place.

ROME.—Work has started on the new plant of the Hanks Foundry Co. in West Rome.

ROME.—The Georgia Foundry & Machine Co. recently doubled its working force in order to meet the demand for mining machinery.

IDAHO

KELLOGG.—The voters have authorized $30,000 in bonds for laying of sewer system.

LEWISTON.—The Northern Pacific announces it will begin work soon on $105,000 steel bridge across Clearwater river.

MOSCOW.—The officers of the University of Idaho are asking the regents for a $75,000 experiment station with which to enlarge on the discovery of Prof. Shattuck, head of the forestry department for extracting by-products from larch and red fir equal in value to the lumber. Authorities say the lumber is not injured and that its weight is greatly reduced, making shipping bills lighter.

SHOSHONE.—The local water company, owned by the Kihn interests, will install a modern filtration plant at a cost of $20,000.

WALLACE.—Officers of the National Copper Mining Co. say new machinery and surface buildings will be erected at mouth of Dead Man's gulch to work new vein. New equipment will include electric hauling equipment.

ILLINOIS

ALTON.—The Alton Steel Co. is planning to place the first two mills of its plant here in operation early in August.

BLOOMINGTON.—Grading work has started in preparation to the erection of the new C. & A. shops here.

CHICAGO.—The Wilson Steel Products Co. advises it is building a small warehouse, as it has not enough room for storage and manufacturing.

CHICAGO.—Adams, Crews, Bobb & Wescott, attorneys for the Smokeless Stoker Co., Chicago, recently incorporated, advise the new company will not build for the present but will have its stokers made. Directors are W. S. Saiter, H. F. Moore and Dwight S. Bobb. W. S. Saiter is president and treasurer. A. S. Hindman, secretary, and H. F. Moore, general manager.

CHICAGO.—Harry A. Porter, Inc., 32 Clinton street, advises the company will carry on the work conducted by Harry Porter for years. The company will devote most of its attention to the sale of electric motors.

CHICAGO.—The Chicago & Eastern Illinois railroad, Wm. J. Jackson and Edward W. Winter, receivers, has been granted permission to issue $4,000,000 in bonds to provide funds for repairs and needed equipment.

CHICAGO.—The Paltridge Metal Equipment Co., 729-730 Monadnock block, Chicago, advises the building it is to put up will be used for making steel shelving, filing cases and other metal equipment for libraries, court houses and other public buildings. The company is looking for a heavy press similar to the Ohls 10-foot 6-inch, weight 28,000 pounds. It also is in the market for a 10-foot power press that will cut up No. 14 gage metal.

KANKAKEE.—The Bradley Works is reported to have purchased a building site for a foundry and other buildings.

MOLINE.—H. W. Horst, of Rock Island, has been awarded the general contract for the erection of the steel foundry and cupola at East Moline for the Deere Co. The buildings will be of reinforced concrete, with special steel construction. The ground floor of the foundry will be 60 x 360 feet.

INDIANA

ANDERSON.—The DeTamble Motor Co., which suspended operations about a year ago for lack of capital, has been organized and operations will be commenced shortly.

BEDFORD.—The coal chutes of the Monon railway were burned recently with several thousand dollars' loss. They will be replaced. The company's offices are in Chicago.

CHARLESTOWN.—The flour mill of Eberts & Bro. here will be considerably enlarged, as well as that at North Vernon, Ind. This is the result of the concern's decision not to rebuild the mill which recently burned at Jeffersonville, Ind.

EVANSVILLE.—The Anderson Wire & Steel Co. has started work on its new plant west of the city, which it plans to be ready for occupancy in August.

GOSHEN.—The Sheet Metal Specialty Co. has been incorporated to manufacture sheet metal; $10,000; by S. O. Leo, S. Nofziger and O. Nofziger, all of Goshen.

HUNTINGTON.—The Huntington Machine & Foundry Co. has been awarded a government contract, amounting to approximately $12,000.

INDIANAPOLIS.—Bids will be called for bridges near Columbus, Ind., July 14 and Brookville, Ind., July 25.

INDIANAPOLIS.—The Enterprise Foundry & Fence Co. has been reorganized and incorporated with an authorized capitalization of $50,000. Those interested in the company under the reorganization are H. I. Raymond Jr., W. H. Holmes and W. S. Glass. The company's plant is at Yandes and Twenty-fourth streets.

INDIANAPOLIS.—An eight-ton, double throw crank shaft is being turned out at the Central Machine Works for the Indianapolis Light & Heat Co. The shaft is 18 feet long, 10 inches in diameter and of solid steel. It will be used for a 600-horsepower engine at the lighting company's Kentucky avenue plant.

INDIANAPOLIS.—In order to expand its business, the Diamond Chain & Mfg. Co. has bought the Holliday & Wyon plant at Ohio and West streets, which will be used as an annex to the company's main plant. The building purchased is of reinforced concrete construction, three stories high, 66 x 145 feet. The purchase price was $30,000.

INDIANAPOLIS.—The Noelke Richards Iron Works has received the sub-contract for the structural steel to be used in the erection of the 15-story building to be erected at Pennsylvania and Market streets for the Fletcher Trust & Savings Co. Approximately 1,800 tons of structural steel will be required. Steel deliveries will begin about Sept. 1 and will be completed about Jan. 1, 1914. The Bedford Stone & Construction Co. has the general contract.

INDIANAPOLIS.—One of the largest automobile factories in this part of the country is to be established here by J. D. Maxwell and associates. Mr. Maxwell was formerly with the United States Motor Co. The property formerly occupied by the T. B. Laycock Mfg. Co., manufacturer of metal beds, has been purchased. This plant occupies a site of forty acres in the northeast part of the city. The building is 270 x 880 feet, with a court at each end, which makes the building resemble a figure 8. Part of the building is three stories high and the remainder one story high. The property has its own heating, lighting, power and water plants.

INDIANAPOLIS.—The Smelser Engine & Machine Works has signed a contract with the Greater Indianapolis Industrial Association for a four-acre factory site at Mars Hill, the new industrial suburb west of Indianapolis. Here a fireproof factory building containing approximately 12,000 square feet of floor space will be erected. Gasoline engines are to be manufactured. The company was recently organized and incorporated with an authorized capitalization of $50,000. Officers have been elected as follows: President, E. G. Ritchie; vice president, James M. Smelser; secretary, Guy M. Churchill and treasurer, Noble H. Wible.

JEFFERSONVILLE.—John Gienger has let a contract for the erection of a grain elevator, and will be in the market for the machinery in the near future.

KOKOMO.—The Globe Stove & Range Co. has plans for an addition to its foundry which will provide about 42,000 feet of space.

NEW ALBANY.—The American Stone Co., which operates a quarry at Floyd Knob, near here, will undertake large development work at Mexia, Tex., including the erection of a brick and tile plant, tripoli refining plant and a veneer mill. Henry Perrette is president of the company.

IOWA

CLINTON.—Work on the new shops of the Northwestern Railway Co. is going forward rapidly. The placing of steel in shop A has been started.

SIOUX CITY.—The Sioux City Service Co. advises its proposed engine house is a $20,000 addition to the present engine room. Equipment has not been purchased.

KENTUCKY

CADIZ.—A. P. White & Co. are planning the establishment of an electric light plant in connection with a large flour mill which they have just erected. A pumping station may also be installed.

CUMBERLAND.—The Cumberland Light & Ice Co. has been sold to the Kentucky Utilities Co.

HOPKINSVILLE.—The Jennie Stuart Memorial Hospital will erect a building which will require considerable equipment. D. X. Murphy & Bro., Louisville, architects.

LOUISVILLE.—A heating plant and re-

frigerating equipment will be needed for Parr's Rest, an old people's home which is to be erected shortly. Brinton B. Davis, Louisville, is the architect.

LOUISVILLE.—The Pennsylvania railway has been called on by the city to elevate its tracks on Fourteenth, running south for more than a mile. The work is to be done in connection with a new bridge over the Ohio river to be erected by the railway.

LOUISVILLE.—The Kentucky Pipe Line Co. has been incorporated with $2,000,000, and will build a line from the West Virginia gas fields. Large pumping stations will be established. The company is owned by H. M. Byllesby & Co.

LOUISVILLE.—The Edwards-Knight Motor Co., Long Island City, N. Y., is contemplating establishing its factory in Louisville. Charles G. Stoddard has been conferring with local financiers regarding the matter.

LOUISIANA

COLUMBIA.—W. O. and E. B. Humphries have been offered a building site free, on condition that they erect a foundry and machine shop.

NEW ORLEANS.—The Johnson Iron Works has secured a building site for its new plant in Algiers.

MAINE

PORTLAND.—The Southern Bend Spring Wheel Co. has been incorporated; $500,000; by Albert F. Jones, president and C. L. Groton, treasurer.

PORTLAND.—The American Chill Wheel Co. has been incorporated; $500,000; by A. F. Jones, T. L. Croteau and A. A. Richards, all of Portland.

SKOWHEGAN.—A fire starting in the foundry of the Hackett & Witham Co. recently did damage amounting to several thousand dollars to that and adjoining plants.

MASSACHUSETTS

BOSTON.—The Eclipse Mfg. Co. has taken out a permit to erect a manufacturing building at 118-134 Harrison avenue.

SPRINGFIELD.—The Crucible Steel Co. of America has purchased a building site on Liberty street and plans to erect a storage and distributing warehouse.

SPRINGFIELD.—The Hendee Mfg. Co. advises its new building will be devoted to general manufacturing and drop forging. Equipment contracts have been let.

WORCESTER.—Henry G. Barr, manufacturer of drills and drilling and tapping machines, 21 Hermon street, sold his plant at auction July 8.

WORCESTER.—The Worcester Cold Rolled Strip Steel Co. has been formed with John W. Higgins of the Worcester Pressed Steel Co., as head, and will manufacture and sell cold rolled steel.

WORCESTER.—The O. C. White Co., manufacturer of electric lighting fixtures, is to double its capacity by taking over the shop now occupied by H. G. Barr, manufacturer of drilling machines, who will retire next week.

WORCESTER.—The Norton Co. has awarded the E. J. Cross Co. contracts for the erection of a fire brick plant, storehouse and a retaining wall at its plant in Greendale, at an estimated cost of $50,000. Both buildings will be of brick and steel, fireproof construction. The firebrick plant will be 128 x 138 feet, two stories, and the storehouse will be 30 x 140 feet, one story. The retaining wall will be of concrete.

WORCESTER.—Schedules of the property of H. G. Barr, manufacturer of sensitive drills, tapping machines and staybolt drilling machines, which was to have been disposed of at public auction July 8, have been distributed to a large number of interested parties. J. E. Conant & Co., Lowell, Mass., will have charge of the sale, consisting of 316 lots. These will be awarded in any number to suit buyer.

WORCESTER.—The Sanford Riley Stoker Co., Ltd., has been incorporated to succeed the business of a trust of the same name, which was organized in September, 1912, to manufacture an automatic stoker, the invention of R. Sanford Riley, formerly president of the American Ship Windlass Co. of Providence, R. I., and now a director of the Norton Co. Capital stock, $200,000. The officers of the company are R. Sanford Riley, president; Aldus C. Higgins, treasurer and F. H. Daniels, clerk. The company has had its product manufactured at the plant of the Norton Co., with general offices at 314 Main street. No change is contemplated in this arrangement at the present time, although the company expects to have a plant of its own in Worcester.

MICHIGAN

ADRIAN.—The Crawford Motorcycle Co., of Saginaw, is considering a proposition to move its plant to this city. Local business men hope to secure the industry to take the place of the Lion Motor Co., whose plant was destroyed by fire last winter.

BAY CITY.—The Royal Coal Mine Co. has discovered on its property a body of fire clay of the finest grade, according to the analyzers, and is making preparations to engage in the manufacture of fire brick. A kiln is to be erected this summer.

COVINGTON.—State railroad commission has authorized an issue of $8,700,000 in bonds for the Sturgeon River Land & Development Co., for dam construction and hydro-electric development on the Sturgeon river.

DETROIT.—The Detroit Furnace Co. has installed a King bridge for handling ore.

DETROIT.—The Rands Mfg. Co. has purchased the assets of the Warren Motor Car Co. through the Detroit Trust Co., receiver.

DETROIT.—The Detroit Laundry Machinery & Supply Co. has merged its business into a stock company under the style of the Detroit Laundry Machinery Co. with an authorized capital of $10,000, all paid in.

DETROIT.—The Miller-Selden Electric Co. has purchased the brick block, 115-119 State street, from Joseph Mack. The building is 50 x 90 feet and is to be remodeled for the company's purposes.

DETROIT.—G. A. and William O. Schacht, formerly connected with the Schacht Motor Car Co. of Cincinnati, are looking for a site for factory in Detroit in which to manufacture motor trucks.

DETROIT.—The Esco Mfg. Co. has engaged in the business of manufacturing a triple locking device for automobiles. The device not only locks off the gasoline supply, but also shuts off the spark as a protection against auto thefts.

DETROIT.—Ground has been broken by the Swedish Crucible Steel Co. of Detroit for its branch plant in Windsor, Ont., which is expected to be ready for operation late in the fall. The company makes an adjustable tool steel plow which has met with success. It is capitalized at $100,000, and N. L. Olson is president.

DETROIT.—Frank J. Congrove, city assessor of Goldfield, Nev., and Joseph Hunter, of Portland, Ore., have been in Detroit conferring with the commerce board and looking over factory sites with a view of establishing a plant of the United States Cashier Co. of Portland in Detroit. The company manufactures money-paying, change-making, computing machines, etc.

DETROIT—Wernette, Bradfield & Mead, engineers and architects, have awarded the contract for the steel sash for the addition to the Ypsilanti Reed Furniture Co. factory in Ionia to the Trussed Concrete Steel Co., of Detroit. They are asking figures on glass, roofing and metal work and also for new elevators at the Michigan state reformatory at Ionia. Plans for the Kent county home powerhouse have been completed and figures for a 25-kilowatt engine and gas generator are asked.

JACKSON.—The Michigan Paper Bag Co. is building an additional story to its plant. When completed new machinery will be added to increase its output more than 50 per cent.

LANSING.—The Muskegon, Ludington & Manistee Electric Railway Co. has filed articles of incorporation with the secretary of state with a capital of $1,500,000. An issue of bonds for a like amount has been approved by the state railway commission. The new line will run along the Michigan shore of Lake Michigan from Muskegon to Manistee. Stockholders are: Thomas Jacobs, Walter Hieston, Henry K. Baldwin and Sidney N. Well, of Chicago, and P. P. Williams, of Washington, D. C.

MARSHALL.—E. A. Cronin of Bryan, O., is reported to be negotiating for the purchase of the plant of the New Process Steel Co.

MINNESOTA

MINNEAPOLIS.—Philip, Rester & Sons, clothing makers, 118 North Fourth street, advise the contract they gave James Leck & Co., for a factory, includes equipment.

MINNEAPOLIS.—The National Quality lamp division of the General Electric Co. has awarded contracts for a group of buildings to be known as the Minneapolis Mazda Lamp Works. Work will begin at once, and the buildings will be ready for operation by January, 1914.

MISSOURI

CARTHAGE.—The Leggett & Platt Spring Bed & Mfg. Co. has increased its capital from $350,000 to $500,000.

HANNIBAL.—The Homestead Fence Co., capitalized at $25,000, is planning to move its equipment here from Kokomo, Ind. Directors of this company are W. B. Arnold, J. B. McNally, S. O. Osterhout, E. V. Morawitz and Casper Butler.

NEBRASKA

OMAHA.—The Palmer Forced Draft Furnace Co. is planning to establish headquarters in Omaha and maintain a foundry and assembling shop at a local foundry. The home office of the company is at Fort Scott, Kan. H. V. Rice, president.

NEW JERSEY

ATLANTIC CITY.—Plans for car shops to be built for the shore trolley lines of the Pennsylvania railroad at a cost of $300,000, have been filed with Chief David Lawson, of the building department. The plans were completed by J. Horace Frank, of Philadelphia, and the contract has been awarded to A. L. & J. E. Pennock, of Philadelphia.

TRENTON.—Between $50,000 and $60,000 will be spent by the City of Trenton, for buildings for the city's dependents on the Tuberculosis Hospital site.

TRENTON.—The plant of the Woven Steel Hose & Rubber Co. was damaged by fire July 1, causing a loss of about $30,000. The company manufactures woven steel hose, ar-

mor for rubber goods and brake lining. The fire will not interfere with the shipment of orders, as machines for the manufacture of the product of the company, made under patent of the Roebling Co., are in stock and being set up for operation..

NEW YORK

BROOKLYN.—The E. W. Bliss Co. is planning an $85,000 foundry addition to its plant, located at the foot of Jay street. The building will be 129 x 199 feet, two stories.

BUFFALO.—The plant equipment and business of the Noyes Mfg. Co., 50 Lake View avenue, will be sold at auction July 10. J. E. Conant & Co., Lowell, Mass., will conduct the sale. The property to be disposed of includes a large amount of machine tools, of which about one-third is practically new, and stock consisting of automobile steering gears and radiators, machine pulleys and woodworking and foundry equipment.

CATSKILL.—The Catskill Foundry & Machine Works is planning to begin the manufacture of Corliss engines.

CORNING.—The E. R. Allen Foundry Co. has thrown up its contract with T. V. Elliott, inventor of the Elliott automatic stoker, whereby it held the exclusive right to manufacture the stoker in this country. Mr. Elliott is planning to go elsewhere and he states a company will probably be formed and a plant established near Cleveland.

LONG ISLAND CITY.—The Renault Ferris Co. will soon begin the erection of a large automobile service building at Jackson, Third and Bebee avenues.

NEWBURGH.—Plans are being prepared for a plant for the Newburgh Tool & Machinist Works, recently incorporated to do a manufacturing and selling business. R. G. Stewart, 166 Montgomery street, is permanently connected with the enterprise.

NEW YORK CITY.—The United States Metal Products Co. is erecting a building at College Point, 50 x 175 feet, two stories.

NEW YORK CITY.—The Concrete Blower Co., Inc., has been incorporated to manufacture machinery and operate a general machine shop; $100,000; by W. Van R. Whitall and M. Stires, both of Pelham, N. Y., and M. Craven, Peekskill, N. Y.

NEW YORK CITY.—The board of water supply will receive bids at its offices, seventh floor, 165 Broadway, until July 22 for furnishing and delivering bronze gate-valves and appurtenances for the city tunnel of the Catskill aqueduct.

NEW YORK CITY.—The New York Machine Screw Corporation has been incorporated to manufacture screw machines, etc.; $70,000; by T. F. Dupuy and B. E. Dupuy, both of 550 West 137th street, New York City, and A. Johnston, South Bethlehem, Pa.

NEW YORK CITY.—The Seamless Products Co. has been incorporated to manufacture all kinds of metal seamless containers; $35,000; by W. F. Morgan, Arch 11, Brooklyn Bridge; Edwin R. Gill, 284 Pearl street, and A. Moir, 161 Chambers street, all of New York City.

NEW YORK CITY.—The Stone & Webster Construction Co., Boston, has been awarded a contract by the Standard Oil Cloth Co., New York City, for the construction of a factory building at Buchanan, N. Y., of reinforced concrete, to cost approximately $600,000.

NEW YORK CITY.—The Westinghouse, Church, Kerr Co., New York City, report that included in some of the recent work taken is the design and installation of the first section of a new boiler plant for Cluett, Peabody & Co., Troy, N. Y., calling for two 300-horsepower boilers. The building will be 30 x 50 feet, of concrete and steel construction.

NEW YORK CITY.—The Fenmore Iron Works Co., 247 East 56th street, which was recently incorporated with a capital of $10,000, advises that it is engaged in the fabrication of general structure and ornamental iron work for buildings. Adolph Weiss is president of the company.

NEW YORK CITY.—The May-Downs Mfg. Co., Inc., has been incorporated to manufacture machinery, hardware, etc.; $5,000; by L. B. May, 119 East Thirty-fourth street and H. D. Downs and M. C. Downs, both of 204 West Fifty-fifth street, all of New York City.

RICHMOND HILL.—The Keystone Materials Co., of Manhattan, N. Y., has located a plant for manufacturing artificial stone at Richmond Hill, Long Island.

SCHENECTADY.—Plans for a new foundry at the plant of the American Locomotive Co. have been approved. The present foundry is 175 x 700 feet, while the new structure, according to plans, will be 175 x 850 feet.

WELLSVILLE.—The Kerr Turbine Co. has been enjoying the largest volume of business in its history. Recent shipments include four 800-horsepower turbines for the Chicago water-works; one 850-horsepower turbine for the water-works department at Nashville, Tenn.; two 100-kilowatt and two 150 - kilowatt turbo - generator sets for the Republic Coal Co., Roundup, Mont.; two 35-kilowatt generator-sets for the steamship Washington Irving; three 75-kilowatt sets for the new steamship Seeandbee for Great Lakes service; two turbo-pump units for the Pittsburgh Crucible Steel Co. and two for the Carnegie Steel Co. Recent export orders have also been received from England, Sandwich Islands and India.

NORTH CAROLINA

ASHEVILLE.—The Asheville Supply & Foundry Co. advises in connection with its new plant now under construction, that it is not in need of any new machinery at the present time. (Noted July 3.)

GASTONIA.—The Crocker Machine & Foundry Co. has been incorporated; $50,000; by Geo. B. Crocker, et al.

OHIO

AKRON.—Bids will be received by the commissioners of Summit county until July 31 for the construction of a substructure and superstructure of a steel viaduct 779 feet 11 inches in length over the Cuyahoga river on North Howard street extension. C. L. Bower, clerk.

CANTON.—The Republic Stamping & Enameling Co. recently increased its capital from $400,000 to $1,000,000.

CINCINNATI.—The H. J. Reedy Elevator Co., 11-15 W. Second street, was damaged badly by fire recently. Stock, machinery and patterns of the plant are valued at $50,000. The loss will be about $20,000.

CINCINNATI.—An extension of the municipal water-works plant has been voted on favorably by the city of Norwood, a suburb of Cincinnati. Bids will therefore soon be asked for on considerable power and pumping equipment.

CINCINNATI.—The Cincinnati & Suburban Bell Telephone Co. advises the structure it is building at Fourth avenue and Hammont street is designed for its exclusive use. It will be ten stories high and fire proof. Harry Hake and Charles H. Kuck are architects.

CINCINNATI.—The Swing-Rickett Co., at 124 Government Place, Cincinnati, will manufacture cut gears and specialties in the machine tool trade. The company will not need any additional machinery at the present time, but it is probable that it will increase its manufacturing facilities within a short time.

CINCINNATI.—The Hess Spring & Axle Co., Carthage, Cincinnati, will spend about $150,000 in the way of additional buildings and extra equipment probably before the close of the present year. This will be done to take care of the increasing business of the company, especially in the automobile axle line. The company has recently increased its capital stock from $100,000 to $350,000.

CINCINNATI.—A warehouse will be built for the Crucible Steel Co. of America on the south side of Third street just west of Elm street, Cincinnati, within the near future. The structure will be 40 x 100 feet, one story, with the exception of the front, which will be two stories in height. The second floor will contain the offices and the first floor will be used as the general warehouse.

CINCINNATI.—The sub-contracts for the erection of the new 12-story Gwynne office building, which will be located at the northeast corner of Sixth and Main streets, Cincinnati, are being let by Superintendent Nils L. A. Malmros, who is the representative of Architect Ernest Flagg, of New York City, designer of the building. The Noelke-Richards Iron Works Co., of Indianapolis, has just secured the contract for the fire escapes to be used on the building.

CLEVELAND.—The Reliable Machine Co. has increased its capital from $10,000 to $15,000.

CLEVELAND.—The American Iron Co. has been incorporated; $10,000; by A. J. Hall, L. E. Krejci, E. H. Krejci, W. H. Thomas and E. V. Thomas, all of Cleveland.

CLEVELAND.—The American Fork & Hoe Co. is motorizing its various plants, the change being made at the North Girard plant at the present time.

CLEVELAND.—Sealed proposals will be received at the office of the secretary of public service, Room 104, City Hall, until July 15 for furnishing and placing 33,000 soft steel hangers for suspended ceilings.

CLEVELAND.—The H. A. Peters Co. of Chicago has been awarded the general contract and the Sprague Iron Works of Chicago, the structural steel contract for the new buildings of the Big Four railroad to be erected at the Linndale yards.

CLEVELAND.—The Republic Structural Iron Works Co. has been awarded the structural steel contract and the Rudolph & Son Co., the sheet metal and rofing contract for the new warehouse of the H. C. Christy Co., to be erected on Lakeside avenue.

CLEVELAND.—Bids for the construction of steel bridges within the state will be opened as follows: July 17, Zanesville, Elyria; July 18, Akron; July 24, Lorain; July 28, Lebanon, Mineral City; July 29, Bucyrus. Advertisements will soon appear for bridges at Tiffin, Hamilton, New Philadelphia and Chillicothe.

CLEVELAND. — The Commercial Auto Body & Mfg. Co., 5345 St. Clair avenue, started operations July 1 for the manufacture of auto bodies. The company is planning to install machinery and equipment for the manufacture of metal auto bodies. M. P. Larson, vice president and general manager, and L. S. Fuller, secretary and treasurer.

FOSTORIA.—The Burrell Engineering & Construction Co., of Chicago, is busy erecting a grain elevator for the Nickel Plate railroad. The building will be 42 x 48 feet, 125 feet high and will have a capacity of 60 cars of grain. It will be fitted out with electrical equipment and will be finished Aug. 1.

FREDERICKTOWN.—The plant of the J. B. Foote Foundry Co., manufacturer of bells, was badly damaged by fire recently.

NILES.—The Ohio Galvanizing & Mfg. Co. is reported to be negotiating with the Middletown Business Men's Association, relative to the removal of its plant to that city.

SPRINGFIELD.—The Gray Electric Co., 121 East High street, advises it does not plan to build a factory and will not need any equipment. Business of the company is more of a resale than manufacturing business.

TOLEDO.—The Essex, a steel ferryboat built for the Detroit & Walkersville Ferry Co., by the Toledo Shipbuilding Co., was launched recently.

TOLEDO.—The Ohio Die & Tool Co. is arranging to remove to larger quarters. The move was made necessary owing to the immense increase in business and the new building is three times as large as the one now occupied. New machinery to the amount of $10,000 has been installed and the new location is at Bancroft and Monroe streets.

TOLEDO.—The Power Equipment Co., of this city, has been awarded the contract for boilers and machinery for the Wildwood Service Co., a corporation formed to furnish heat, electricity and water to allotments being opened up in the Delaware Creek Valley. The work is now well under way and will be completed by Aug. 15.

TOLEDO.—John D. Gerken & Co. are now located in the new building at 25-29 Ontario street and have one of the most modern sheet metal shops in this section. Power is used exclusively for the forming of sheet metal products. A 28,000-pound press bends 10-foot sheets from light 28-gage to heavy 10-gage, eliminating the use of the slow cornice brake and other hand tools. A 10-foot squaring shear replaces the hand and foot lever shears. A mitre cutter that is adjustable to any size, a slip roll for large pipes and breechings and a crimper are among the improved machinery recently installed by this concern. The extraordinary lighting arrangements transform the shop into a "day-light" shop. The shop has been doubled in capacity during the past year.

YOUNGSTOWN.—The Youngstown Sheet & Tube Co. advises the loss in a recent fire at its plant was slight and fully covered by insurance. A small section of the roof of the warehouse was burned. The building being steel, the fire could do no damage.

YOUNGSTOWN.—Louis Adavasio & Co., Youngstown, are low bidders on the proposed reinforced concrete dam at Milton, to be built in conjunction with the waterworks plant of Youngstown. A considerable tonnage of reinforcement bars will be used.

OREGON

ALBANY.—A franchise for a gas plant has been awarded by city council to G. L. Raugh of Portland.

BANDON.—The large mill of the Randolph Lumber Co. has been destroyed by fire with a loss of $75,000 almost entirely covered by insurance. Plant will be rebuilt at once.

COVE.—The flour mill of the Mt. Fannie Flour Mill Co. has been destroyed by fire with a loss of $40,000. There was $30,000 insurance and plant will be rebuilt.

DAYTON.—Plans for a municipal water system are being prepared by Jones & Flagg, of McMinnville.

ECHO.—Bonds amounting to $1,200,000 have been sold for Teal irrigation district.

EUGENE.—The council has passed 10 ordinances for lateral sewers in suburb of Fairmont.

LEBANON.—The council has ordered tenders for cluster lights along 7 blocks in business section.

McMINNVILLE.—Bids will be received by County Judge V. W. Pearce at noon July 18 for steel bridge, 120-foot span, across North Yamhill river at city of Carleton. Jones & Flagg, engineers.

OREGON CITY.—The city council has accepted offer of Oregon Bridge & Construction Co. of $11,980 for elevator up bluff.

PORTLAND.—All bids for new cells in city jail estimated to cost $50,000 were rejected and new tenders will be invited.

PORTLAND.—The Good Samaritan hospital will erect a heating plant at a cost of $20,000.

PORTLAND.—The water committee has instructed the city auditor to advertise for bids for 2,000 tons of 8-inch and 300 tons of 6-inch cast iron water pipe and 125 tons of special castings.

ROSEBURG.—Bids will be received by County Clerk E. H. Lenox June 12 for Oak street steel bridge of four 175-foot spans. Plans may be had from county engineer.

PENNSYLVANIA

ALLENTOWN.—The Allentown Brass & Hardware Co. is establishing a plant at Rittersville, for the manufacture of hardware and brass goods. The officers of this company are D. B. Trexler, president and G. T. C. Krasley, secretary and treasurer.

ERIE.—The Lake Shore & Michigan Southern Railroad Co. is planning to increase its freight facilities here, and rumors are being circulated to the effect that car repair shops may be erected soon near the General Electric Co.'s plant.

PETROLEUM.—The Petroleum plant of the Pressed Steel Products Co. will start operating next week. It will make steel bilge barrels and other specialties.

PHILADELPHIA.—The Baldwin Locomotive Works recently secured orders for six locomotives, the orders coming from different companies.

PHILADELPHIA.—Machinery to the value of $325,000 was recently ordered for the new Western Maryland shops in course of erection at Hagerstown, Md.

PHILADELPHIA.—The William Linker Co., of this city, has been awarded the contract for a chemical and physical laboratory to be erected at the Altoona shops of the Pennsylvania railroad, at a cost of $140,000.

PHILADELPHIA.—The Davies & Thomas Foundry & Machine Co. has recently received a large order from the United Gas Improvement Co., which will keep the concern working at full capacity for some time to come.

PHILADELPHIA.—The Central Machine Co. is calling for estimates upon a machine shop, 44 x 110 feet, three stories, to be erected at Seventh and Wood streets. Penckert & Wunder, architects.

PHILADELPHIA.—The McElhatton Foundry Co. has purchased the foundry buildings at the southwest corner of 15th street and Washington avenue. The site is 47 x 110 feet.

PHILADELPHIA.—The Pennsylvania railroad recently awarded the contract for building a train shed and office building and delivery tracks at Pottsville, Pa., to the Beard Construction Co., of Reading, Pa., at $80,000.

PITTSBURGH.—McAllen Bros., plate and sheet iron workers, advise they have not completed their organization, a charter for the company only just having been granted.

PITTSBURGH.—The S. K. P. Mfg. Co. has been incorporated to manufacture gas engines; $10,000; by A. F. Schmidt, L. Hays Gott, E. A. Krch, Jr. and W. J. Peters, all of Pittsburgh.

PITTSBURGH.—The Jamison Coal & Coke Co., Oliver building, has ordered a 400-horsepower Erie City water-tube boiler for its works at Barrettsville, W. Va., from the Erie City Iron Works, Erie City, Pa.

PITTSBURGH.—The Riter-Conley Mfg. Co. has taken the following orders: Two 50-ton ladles, the Carbon Steel Co., Pittsburgh; 64 transmission towers for Brazil; 30 tainter gates, involving 300 tons, for the American Water Works & Guarantee Co., Pittsburgh.

PITTSBURGH.—Announcement was made last week that the Shenango Furnace Co., W. P. Snyder, president, expects to erect a by-product coke oven plant at its furnaces at Sharpsville, Pa., where three stacks are under operation. The size of the proposed coke oven plant has not been determined.

PITTSBURGH.—The Bessemer railroad, the Steel Corporation's ore road from Pittsburgh to Conneaut, O., will spend $400,000 enlarging its Greenville, Pa., shops. A big addition will be made to the machine shop. The railroad has bought the Hodge factory site, which will permit further extensions.

PITTSBURGH.—The Allis-Chalmers Co. through its Pittsburgh office, has taken an order from the Carnegie Steel Co. for the installation of a 30 x 56 x 54 inch cross compound engine direct connected to gear drive for the operation of an 18-inch sheet bar mill at the Mingo Junction plant, Mingo Junction, O. The engine will weigh 750,000 pounds and will be under manual control by throttle under all speeds up to 85 revolutions per minute.

PITTSBURGH.—The floor of the boiler room of the Armstrong Cork Co.'s works at Pittsburgh will be raised four feet to place it above the flood line and numerous other improvements will be made, contracts for which were awarded the Charles N. Hays Co., this city. Other improvements include: installation of two 400-horsepower Babcock & Wilcox water-tube boilers operated by Playford chain grates; two 10 x 6 x 18-inch Canton-Hughes boiler feed pumps; new system of steam piping; complete coal and ash handling system and the erection of a 200-foot stack 10 feet in diameter.

PITTSBURGH.—Government engineers have recommended the placing of orders with the lowest bidders for power plant buildings and equipment for dams Nos. 7 and 9 in the Ohio river. Successful bidders follow:

Building for dam No. 7, $22,310, dam No. 9 $26,201, H. L. Kreusler, Pittsburgh; two boilers, $3,000 each, Heine Safety Boiler Co., Fulton building, Pittsburgh; feed water pumps at $72 and $69, service pumps, $935 and $900, Reineke-Wagner Co., Pittsburgh; Dravo-Doyle Co., Pittsburgh, feed water heaters, $273.80 and $263.80; air compressors and receivers, two at $2,883 each, Hall Steam Pump Co., Pittsburgh; piping, $2,795 for each installation, Moss & Blakely.

POTTSVILLE.—H. T. Nelson, of Lebanon, Pa., has been appointed general manager of the Schuylkill Haven Rolling Mills, which resumed operations after two years of idleness. Many improvements in the form of a new puddling mill and additional iron works will be started in the near future. Bar iron will be the principal product of the plant.

SCRANTON.—The Scranton Pump Co. has been incorporated; $500,000; by M. H. Dolph, S. E. Dolph, E. B. Sturges, C. H. Genter and J. A. Lennon, Jr., all of Scranton.

SHARON.—The Knox Welded Steel Co., which recently bought the plant of the Sharon Boiler Co., will begin operating in a few days. Some 200 men will be employed. Machinery was moved from Niles, where the company's old plant was burned. Electrically driven machines will be used.

WAYNESBORO.—The Waynesboro Metal & Foundry Co. is planning to enlarge its plant.

TENNESSEE

BRISTOL.—The plant of the Dominion Iron Works, sold recently for debts, was placed

in operation July 1. The new owners, Frank H. Miller and H. L. Cecil, are operating the plant as a stove works.

CHATTANOOGA.—The Strickland Pattern Works has been incorporated with $15,000 capital stock by Barney Strickland, U. G. Caulk, John Lamb and others.

GREENEVILLE.—The bond issue which has been up for some time has been approved. It amounts to $15,000, the proceeds to be used for improving the water-works plant. C. E. Jenks, Union City, Tenn., is the engineer in charge.

KNOXVILLE.—The Aluminum Co. of America is planning to locate a plant near Maryville on the Little Tennessee river.

KNOXVILLE.—An interurban line will be built between this city and Maryville, a distance of 14 miles, by the Maryville-Knoxville Interurban Railway Co., which has been incorporated with $10,000 capital stock. Howard Cornick, T. G. McConnell, Charles M. Seymour and others are interested.

KNOXVILLE. — The Sanford-Day Iron Works, Inc., advises it expects to buy a considerable quantity of tools and machinery for new shops within the next 60 days. Machinery may be bought new or second handed. The list submitted includes the following: One double-ended shear, throat about 12 inches deep, capacity about 6 x 1-inch flats, belt driven. One sheet metal punch, preferably with gag attachment, throat not less than 24 inches, belt driven. One gate shear to take plate 12 feet between housings, capacity, ¾-inch plates. One bulldozer, equivalent to No. 6 or No. 7 Williams White. One belt driven air compressor with unloading attachment, capacity about 100 cubic feet at 100 pounds pressure per minute. One 1½-inch bolt and rivet heading forging machine of late pattern.

MEMPHIS.—R. J. Darnell, Inc., advises it will rebuild its lumber mills, recently burned. The company will put in a veneer plant at Memphis and a saw mill at Batesville.

NASHVILLE.—The plant of the Tennessee Packing & Stock Yards Co. was burned July 1, the damage being estimated at $300,000. The power plant, cold storage plant and other machinery were a total loss. It is probable that the plant will be rebuilt. J. O. Swingley is secretary of the company.

TEXAS

FORT WORTH.—The city council is considering several propositions for the installation of machinery equipment in its water works plant.

HOUSTON.—The Peden Iron & Steel Co. has completed and is now occupying a new addition to its plant which more than doubles its former capacity, giving the company a total of 296,000 square feet of floor space. The company is capitalized at $1,000,000. E. A. Peden, president.

TEMPLE.—The Santa Fe railway is planning to enlarge its machine shops and round house at this place, at an approximate cost of $40,000.

VIRGINIA

BRISTOL.—The Coal Washer Corporation has been incorporated; $50,000; by J. B. Carmody, president; C. H. St. Johns, vice president; P. Dulaney, secretary.

CHARLOTTESVILLE.—Ryall's Machinery Corporation has been incorporated; $50,000; by H. S. Hedges, president; C. H. Walker, vice president; R. W. Garnett, secretary and treasurer.

WASHINGTON

ASOTIN.—Snyder Bros. announce that they will build a saw mill.

AUBURN.—The city council will submit bond issue of $10,000 to voters for a municipal water system.

BREMERTON.—The city council has accepted the offer of the Bremerton Light & Fuel Co. for the sale of its plant. Bond isue contemplated for additions and extensions.

CHEHALIS.—William Lloyd has rented the foundry at the plant of the Chehalis Foundry & Machine Co., instead of purchasing the entire plant, as noted previously. E. C. York, manager.

ELLENSBURG.—Bids will be received soon by the city council for 65 fire hydrants.

ELLENSBURG.—Bids will be received July 10 by R. Lee Barnes, secretary of the Cascade Irrigation district, for 24,700 linear feet of steel flume. Plans from engineer.

SEATTLE.—The electrical contract for new Y. W. C. A. building has been awarded to Le Page, McKenney & Co., 325 Yesler Way, for $6,000.

SEATTLE.—The Grand Union Laundry has been issued permit to spend $25,000 in alterations to building. Company announces it will spend several thousand dollars more in buying new machinery.

SEATTLE—The Port of Seattle commission will receive bids July 23 for one gantry crane, locomotive crane and other mechanical apparatus for handling heavy cargoes from dock to steamers. Specifications may be had from engineer.

SPOKANE.—The contract for the plumbing in the Whittier school has been awarded to Arnold Evans for $5,700.

SPOKANE.—The city council has ordered $20,800 worth of lateral sewers laid to connect with first ward sub-trunk sewers.

SPOKANE.—The H. E. M. Mining Co. has announced that it will buy a concentrating mill and have it erected within 90 days.

SPOKANE.—Engineers have finished the plans for the Trent road viaduct for Spokane International and Spokane & Inland Empire roads. Bids will be called for soon.

SPOKANE.—The Marshall Lake Power & Land Co. will develop power at Marshall lake at a cost of $60,000. W. H. Wright, 3215 Madison street, president.

SPOKANE.—Plans have been completed for the union terminal station of the Oregon-Washington Railroad & Navigation Co. and the Chicago, Milwaukee & St. Paul Railway Co. Bids for the station, which will cost about $300,000, will probably be asked within a short time. J. R. Homan, Seattle, assistant general manager and chief engineer, in charge of terminals.

TACOMA.—The city commission is planning to erect a factory building on city property and let it to new industrial concerns.

TACOMA.—The Puget Sound Iron & Steel Works, manufacturer of logging equipment and supplies, is contemplating additions to its plant in order to add a line of contractors' equipment.

TACOMA.—The city council has been petitioned by the residents of the suburb of Fern Hill for water mains. City engineer is investigating. About 40 blocks of mains will be laid if the work is ordered by the council.

WALLA WALLA.—The board of overseers of Whitman college has appointed a committee of three to prepare plans for cenral heating plant.

WISCONSIN

APPLETON.—The Killen-Walsh Mfg. Co., maker of field and farm tractors, road building machinery, etc., intends to build a large shop building in the fall. The company has just commenced active operations in tractor manufacture in leased quarters. William Strait is superintendent.

ASHLAND.—The Pittsburgh & Ashland Coal & Dock Co., of this city, has filed an amendment increasing its capital from $25,000 to $50,000.

DE PERE.—The common council has contracted with the DePere Light & Power Co. to furnish all municipal lighting, including the installation of the system.

EAU CLAIRE.—The Western Machine Mfg. Co. has increased its capital from $40,000 to $70,000.

GREEN BAY.—The Fairbanks-Morse Mfg. Co., Chicago, has leased the Hartman-Greiling warehouse, Howard and Pearl streets, and has established a branch warehouse for farm and marine engines for the northwestern territory. Repairs will also be made. Equipment has been purchased. Carl Hansen is manager.

KENOSHA.—The Thos. B. Jeffrey Co. has just taken occupancy of its new administration building, erected at a cost of $75,000. The building is constructed of vitrified paving brick and contains 10,000 square feet of space.

LA CROSSE.—The Hans Motor Equipment Co. advises it has started work on a concrete and steel factory with saw tooth roof, one floor and 25,000 floor space. It is to be completed in October.

MILWAUKEE.—The National Brake & Electric Co. is planning to build a foundry near the North avenue bridge, at a cost of $90,000.

MILWAUKEE.—The Gauger Bros. Co., Inc., has been incorporated to do a general plumbing and gas fitting business; $1,500; by F. A. Gauger, W. F. Gauger, and W. A. Bartelet, all of Milwaukee.

MILWAUKEE. — The Milwaukee-Western Cold Storage Co. has been organized by J. J. Emery, John J. Foley and H. F. Friedrich Jr., with an authorized capital of $300,000, to erect and operate a general cold storage plant.

MILWAUKEE.—The Harley-Davidson Motor Co., maker of motorcycles, advises its factory No. 8, is rapidly approaching completion. Machinery was contracted for recently and will be used in making a new style motorcycle truck. The truck is designed to carry 600 pounds besides the driver.

MILWAUKEE. — The Ticonic Investment Co. is building a $50,000 garage, 90 x 120 feet, two stories, for George W. Browne, 462 Milwaukee street. A 10,000-pound freight elevator, 10 x 22 feet, and a miscellaneous list of hand and power tools will be required.

MILWAUKEE.—The Schlesinger interests have organized a new concern to operate in West Virginia. The concern is styled the Elkhorn Gas Coal Mining Co. of Milwaukee, and is chartered by the state of West Virginia. The authorized capital is $200,000. Ferdinand and Henry J. Schlesinger, Edward Wilmer and Chas. D. Weeks appear as incorporators.

NEILLSVILLE.—The Farmers' Co-Operative Elevator Co., capital $20,000, has been organized by George C. Crothers and will build and equip an elevator and mill.

OSHKOSH.—The Williams Auto Sales Co., organized by W. S. Williams, has leased the Stroud building and will remodel it for garage and machine shop purposes.

OSHKOSH.—The F. S. Hoaglin Auto Co. will add another story to its garage and repair shop, 60 x 150 x 40 feet, and intends to add considerable power equipment.

PLATTEVILLE.—The Midland Lead & Zinc Co. has been incorporated to do a general mining and milling business; $25,000; by R. E. Davis, P. K. Kelley and G. Dobson, all of Platteville.

RACINE.—The Racine Drop Forge Co. has been incorporated to manufacture forges, etc.; $20,000; by A. Blackward, P. Black-

ward and M. E. Walker, all of Racine.

RACINE.—The Richmond Radiator Co. of Philadelphia, which took over the properties of the defunct McCrum-Howell Co. some months ago, has decided to abandon the Racine works, formerly the U. S. Standard Electric Co., where much of the electrical work on McCrum-Howell goods was done prior to the receivership. The equipment of the Racine shops is being shipped to Philadelphia and the building will be sold.

RACINE.—The Sterling Mfg. Co., capital $10,000, has been incorporated by C. C. Gittings, L. Powell, E. L. Osborne and G. H.

SHEBOYGAN.—The E. & H. Motor Co. has purchased a building site at Ontario avenue and Ninth street and proposes to erect a $15,000 garage and repair shop.

DOMINION OF CANADA

ALBERTA

CALGARY.—The Northwestern Brass Co. has awarded the contract to Westinghouse, Church, Kerr & Co., New York City, for the construction of a foundry building 100 x 200 feet, with a wing 40 x 73 feet. The plans have been prepared by the A. B. Baker Engineering & Appraisal Co., Buffalo, N. Y. Reinforced concrete will be used throughout.

CALGARY.—A. W. Ellson Fawkes, waterworks engineer of Calgary, is desirous of getting in touch with concerns which handle temporary transportation equipments necessary for the construction of the 45 miles of pipe line in which the city may bring its water from the Rocky Mountains. A temporary railroad track, about 2 feet, 4 inches gage, two dinkie engines and about 12 cars will be needed.

EDMONTON. — The Cannal & Spencer Construction Co. has been awarded the contract by the city for the erection of a laundry and powerhouse for a hospital at a figure of $45,000.

BRITISH COLUMBIA

COQUITLAM.—The council is joining Port Coquitlam and New Westminster in urging the British Columbia Electric Railway Co. to run an electric railway from New Westminster to Port Coquitlam.

VANCOUVER.—The Vancouver Timber & Trading Co., Ltd., will erect a large saw mill opposite Port Moody, B. C.

VANCOUVER.—Work on the first unit of the plant to be put in by the British Columbia Gas Co., a subsidiary of the Vancouver Gas Co., will be started this year and the cost will be $750,000. The whole plant, which will be erected close to the city, will cost nearly $3,000,000.

VANCOUVER.—The recently incorporated Bridge River Co. plans to develop electricity from the water powers at Lillooet, B. C., to the extent of 200,000 horsepower. This will necessitate building a large dam on the Bridge river, and a tunnel, involving an expenditure of about $8,000,000. W. C. Smith, engineer of the Department of Lands, Victoria, B. C., has been over the land.

VANCOUVER. — The British Columbia Electric railway, Vancouver, is having plans prepared for the construction of shops at Burnaby, B. C. These will consist of a machine shop, blacksmith shop, wheel shop and store house in a combination building 70 x 355 feet, machine shop, 70 x 160 feet, stripping and erecting shop with 10 pits, wash and wheel shop, 65 x 120 feet, storehouse 35 x 130 feet and a paint, erecting, wood working, cabinet, door and sash varnishing building, 130 x 330 feet. In this latter building is included oil and paint storage basement and oil serving equipment. All the buildings will be of structural steel with concrete foundations, brick walls and wood roof. The company is also planning the construction of a double deck car barn in Vancouver. The first floor will be 130 x 350 feet and the second floor 130 x 300 feet. The barn will contain a small machine shop and store room, oil room and sand apparatus. Other construction planned is a car barn, 105 x 300 feet, at North Vancouver and a barn and shops at Victoria, B. C. Westinghouse, Church, Kerr & Co., New York, are the engineers for all this work.

VICTORIA.—Tenders will be received until July 15, for laying about 27½ miles of reinforced concrete pipe and appurtenances. C. H. Rust is water commissioner.

VICTORIA.—A plant will be erected on Madge Island by the Capital Shale Face Brick Co. It is capitalized at $100,000 and is being promoted by M. T. Bond, of Lichfield, Eng.

STEVESTON.—Tenders will shortly be invited for the second unit of Steveston jetty which is expected to cost $200,000. Tenders for the first unit of the work at $100,000 are now being received.

MANITOBA

WINNIPEG.—Mr. Bury, vice president of the C. P. R., announces that the contract for electrifying the railway from Castlegar to Rossland, B. C., has been awarded to the Canadian General Electric Co. Direct current, trolley system of 2,400 volts will be used.

WINNIPEG.—Sealed tenders addressed to the chairman of the board of control will be received up to Saturday, August 9, for the manufacture and erection on a foundation supplied by the city of a 1,000-kilowatt motor generator. Specification and forms from the city light and power department, 54 King street. M. Peterson, secretary.

ONTARIO

AURORA.—The citizens have adopted a by-law ratifying an agreement with the Toronto & York Radial railway, by which the town will obtain for five years all the electric power required for lighting, municipal or industrial purposes at $25 per horsepower. The company is installing a turbine steam plant and high voltage generator at Bond Lake as an auxiliary to secure continuity of service.

BERLIN.—The Beck Duplicator Co. of New York City has taken an option on land, and propose building a branch plant for the Dominion. H. M. Isaacs is secretary of the company in New York.

FORT WILLIAM.—The National Boiler Works of Superior, Wis., has arranged for the construction of a plant here for the manufacture of boilers and later structural steel. The new plant will be 140 x 260 feet.

HAMILTON.—Extensive damage was done to the plant of the Steel Co. of Canada on June 29 when one of the furnaces blew up. The furnace will have to be relined and one side of the building was blown out and the water-pipe system wrecked. The loss may amount to about $40,000.

HAMILTON.—A branch factory of the Massachusetts Saw Works, of Springfield, Mass., will be established in Hamilton under the name of the "Victor Saw Works, Ltd.", and will manufacture the Victor hack saws. The factory on Adams street, formerly occupied by the Laidlaw Bale Tie Co., has been leased and is now being fitted up for the new concern. The Canadian company will have a separate organization with J. W. McQuillan as president; Harold F. Stout, vice president, and E. S. Bradford, secretary-treasurer. Amos Hutton, of Hamilton, has been appointed master mechanic.

NIAGARA FALLS.—The Niagara Falls, Welland & Dunnville railway will shortly spend $800,000 on a new line, cars, depots, etc.; and will start the construction of the first section of the line from Niagara Falls this summer.

NIAGARA FALLS.—The American Cyanamid Co. is planning the erection of an extensive plant which will be of structural steel and reinforced concrete and tile brick construction. The plant will consist of the following buildings: Carbide building, 110 x 144 feet; cyanamid building, 91 x 390 feet; hydrating and granulating building, 110 x 220 feet; cooling building, 85 x 110 feet; raw material bins, 26 x 53 feet; wash house, 40 x 97 feet; office building, 31 x 81 feet; laboratory, 31 x 81 feet; liquid air building, 60 x 120 feet; store house, 40 x 80 feet; coke dryer building, 42 x 81 feet; and miscellaneous buildings. Lime nitrogen silos, 56 x 56 feet and lime kiln building 50 x 115 feet. The plant will be fitted with electrical equipment. Westinghouse, Church, Kerr & Co., New York City, have been commissioned for the design and construction of the plant.

OTTAWA.—A six-tenths grade will be created on the Intercolonial railway from Montreal to Halifax, F. P. Gutelius, general manager of the road, has announced. The work will be carried out gradually.

OTTAWA.—The government has awarded a contract for dredging at Port Arthur to W. L. Phin, Port Arthur, for $122,460, and to the Randolph Macdonald Co. for dredging at Bellville, Ont., for $116,000.

OTTAWA.—Plans will be ready this week for the new interior elevators which the Canadian government is about to build at Moose Jaw and Saskatoon, each of which will cost about $1,000,000 and have a capacity of from 3,000,000 to 4,000,000 bushels.

OTTAWA.—The Flexible Railway Supply Co. will apply to the government shortly for a charter, and will then build a plant in this city for the manufacture of railway supplies of all kinds. Charles Forth, Boston, Mass., is the promoter and manager of the company.

OTTAWA.—The Canadian government has awarded the contract for the Halifax Terminal railway, five miles in length, in connection with the Intercolonial, to the Cooke Construction Co. of Sudbury, Ont., and A. B. Wheaton, of Amherst, N. S., who will carry on the work jointly. The contract price is $1,500,000.

OTTAWA.—A commission will be appointed by the Dominion government to inquire into the feasibility of the construction of the Georgian bay canal as a financial project. Engineering plans already drawn up show that it will cost in the neighborhood of $105,000,000, being, of course, the largest canal project in the history of Canada. The deepening of the St. Lawrence canal to a depth of 35 feet is an alternative project.

PETERBORO.—The city is now having valuations made of the plant and distribution system of the Peterboro Light & Power Co. with a view to taking it over.

TORONTO. — The Kipawa Power Co., Ltd., has been incorporated to carry on a general power business in electricity, natural

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CLEVELAND

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PENTON'S BOOK NEWS

CLEVELAND

gas, etc., by William A. J. Case, James B. Taylor, Donald D. Fish and others of Toronto.

TORONTO.—The water-works plant on the Island, which now supplies 40,000,000 gallons of water per day, is to be increased to give a supply of 100,000,000, Mayor Hocken has announced. The work will be done next spring.

TORONTO.—Owing to frequent interruptions in the Provincial Hydro-Electric system supplying this city with power from Niagara Falls, the Toronto Hydro-Electric Power Commissioner has decided that the city must have an auxiliary steam plant, which will cost approximately $1,000,000. It will have to be located on the water front so as to receive coal by water as well as by rail.

TORONTO.—The Ontario Hydro-Electric commission will in the near future commence the building of a transmission line through the Morrisburg and eastern Ontario district with Kingston as the principal city. This line will be 22,000 volts capacity and 40 miles in length with many branches. The power will in all probability be obtained from one of the companies on the American side of the St. Lawrence river.

TORONTO.—Plans for the new Union station to be built in Toronto show that the building will be of white stone with steel frame and fireproof throughout. A network of subways will form the approaches to the trainsheds which will be connected with the passenger platforms by a number of freight and passenger elevators. Mechanical porters will eliminate the carrying of baggage and an elaborate system of baggage transfers will be installed.

TORONTO.—At the annual meeting of the Jupiter Mines of Porcupine, Ont., held in Toronto last week it was announced that plans for a new mill and plant had been completed. The first installation will have a crushing capacity of 80 to 100 tons per day and is being designed to permit of additions at a minimum cost without interfering with operations. R. W. Brigstocke, consulting engineer to the Drummond mines and the Canadian Exploration Co. is president of the concern.

TORONTO.—Boving & Co., of Canada, Ltd., 164 Bay street, Toronto, advise their recent incorporation was to change the name from the Canadian Boving Co., to bring the style into line with the London company. Stock of the company has been increased to $1,000,000 and the Madison, Williams Mfg. Co., Lindsay, Ont., has been bought. Large additions are to be made at once and the company expects to increase its capacity three times within a year. Officers will be: President, Jens Orten-Boving, M. I. M. E., London, Eng., vice president, Percy S. Cowell, of the firm Touche & Co., auditors for the company.

TORONTO.—The Canadian Nickel Corporation, Ltd., is being organized with a capitalization of $30,000,000. The properties of the company cover approximately 17,500 acres in the Sudbury district, including the Murray mine. As the result of the development work up to May 1, 6,800,000 tons of ore are stated to have been blocked out, being sufficient to operate on the basis of 1,500 tons per day for about 13 years. The engineers estimate that the properties contain a further amount of equal quantity. Among those identified with the company are Dr. F. S. Pearson, president of the Brazilian Traction, Light & Power Co.; J. Frater Taylor, vice president of the Lake Superior Corporation; J. E. McAllister, Benjamin I. Lawrence, consulting engineer, New York.

QUEBEC

MAISONNEUVE.—Vickers, Maxim & Co., the noted British shipbuilders, are building a plant here, and will probably make a bid for the construction of the ice breaker which the Dominion government proposes to buy.

MONTREAL.—A factory building, 50 x 75 feet, two stories, is to be built for the Canada Wire Factory. The architects are T. Pringle & Sons, Montreal.

MONTREAL.—The firm of Heap & Partners has been awarded a contract for the suply of 34 Rees-Roturbo pumps for the Acadia Sugar Refining Co. They range from 10 to 180 horsepower.

MONTREAL.—The Dominion Wire Rope Co., Ltd., has awarded the contract for building a new plant, 90 x 91 feet, to E. G. M. Cape, Birks building, Montreal. The plant will be situated at Lachine, Que.

MONTREAL—International Valve Co., Ltd., has been incorporated to carry on the business of mechanical engineer and manufacturer of plants, engines, tools, etc.; $50,000; by Errol Languedoc and Edgar Parkins.

MONTREAL. — The management of the Canadian Pacific railway is considering the electrification of the company's lines into Montreal, following the policy of the Canadian Northern railway, which will enter the city over electrified lines.

MONTREAL.—A report received by the Board of Control from F. S. Williamson, consulting engineer, recommends the establishment of an underground tram service with 12½ miles of two-track lines, by the city at an expenditure of $20,000,000. He predicts a gross revenue of $3,000,000 and a net revenue of $1,500,000 for the first year with 12 per cent profit at the end of ten years.

MONTREAL. — The appropriations made for the current year by the Canadian Pacific railway to be spent on the construction of additional railway mileage, cars and locomotives, terminal facilities at St. John, Montreal, Toronto, Fort William, Winnipeg, Calgary, Vancouver and elsewhere, for ocean steamships and hotels, extensions of the telegraph systems, shops, sidings and improvements generally in Canada, will approximate nearly $100,000,000.

QUEBEC.—Tenders will be called shortly for the construction of the highway from Sherbrooke, Que., to Derby Line, Vt.

SASKATCHEWAN

ESTEVAN.—The ratepayers will be called upon July 15, to authorize the raising of $8,000 for the purchase of an electric light system for the town.

SASKATOON. — Extensions which practically double the former capacity of the Quaker Oats Co.'s plant, are almost completed.

SASKATOON.—The interior storage elevator which the Dominion government has announced it will erect in Saskatoon will have a first unit of 5,000,000 bushels capacity and when completed will have a capacity of 25,000,000 bushels.

SASKATOON.—Three separate propositions are put forward as a means of securing cheap power for Saskatoon. One of these involves the generation of power at a point some 125 miles from Saskatoon and its transmission to the city.

SASKATOON.—Construction has been commenced on a factory building for Marshalls & Son, agricultural implement manufacturers of Gainsboro, Eng., who have decided to establish a Canadian plant. The building will be of brick and steel, 130 x 150 feet, two stories.

YORKTON.—Ritchie & Watters have been given a contract at $36,557 for the erection of an electric power station for the city.